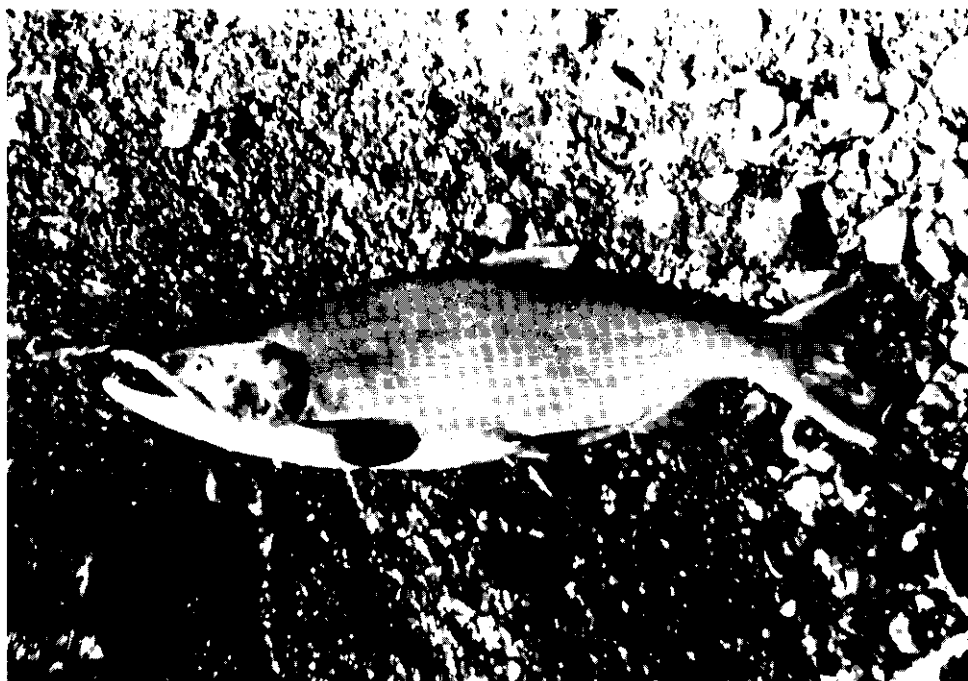


FISHERY RESEARCH



FEDERAL AID IN FISH RESTORATION

Job Performance Report, Project F-73-R-8 Subproject II:
Salmon and Steelhead Investigations Study I: Salmon
Spawning Ground Surveys



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JOB PERFORMANCE REPORT

State of: Idaho Name: SALMON AND STEELHEAD
INVESTIGATIONS
Project No.: F-73-R-8 Title: Salmon Spawning Ground Survey
Study No.: 1
Job No.: 2
Period Covered: March 1, 1985 to February 28, 1986

ABSTRACT

Each year regional fishery biologists survey major chinook salmon spawning areas in their respective regions to count the number of redds constructed in trend count areas and to obtain age and sex composition data. Current redd counts and long-term trends are made available in this report for trend analysis, management, and research use.

Most Salmon River redd counts follow a steadily decreasing trend. Spring and summer chinook redd counts in the Salmon River exceeded counts of 1984 as well as the previous 5-year averages. Spring chinook counts for 1985, however, fell below the 1981 redd counts which produced the 1985 runs, while summer chinook redds nearly doubled those of the parent generation. As artificial programs are expanding, the downward trend appears to be reversing.

South Fork Clearwater drainage redd counts have steadily increased due to the success of the Red River rearing pond program. South Fork redd counts increased by 30% this year over 1984 counts and were nearly double the previous 5-year average. Inclement weather prevented surveys from being completed on the Selway drainage, and redd counts on the Lochsa drainage increased 65% over last year's counts.

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RECOMMENDATIONS

Where practical, ground counts should be replaced with helicopter counts to increase speed and consistency of counting. However, in order to obtain sex and age composition data from kelts, ground counts should be continued in areas where spawning activity is most concentrated.

Sockeye salmon surveys should be conducted on Redfish Lake around the Sandy Beach boat ramp in October of each year.

OBJECTIVES

To monitor salmon spawning escapements and to measure sex and age composition of individual runs.

TECHNIQUES USED

Redd counts are made on selected Clearwater and Salmon River drainage streams to determine trends in the size of chinook salmon spawning escapements. Counts are made from low flying, fixed-wing aircraft, helicopter, or on foot, depending on which technique is best suited for a particular stream. Redds are counted when preliminary observations indicate that spawning is over and before redds are obscured by algae and silt.

Carcass surveys to identify sex ratios and age composition are ideally made three times during post-spawning die-off to eliminate bias in sex ratios noted early and late in the season.

Sockeye salmon counts have traditionally been made from a small boat on Redfish Lake. The trend area on Redfish Lake is about 0.8 km of shoal on the east shore of the lake south of Sandy Beach. In 1985, a weir was installed on Redfish Lake Creek to trap and count all adults entering Redfish Lake.

FINDINGS

Salmon River Drainage

Chinook salmon redd counts on the Salmon River have declined steadily over the past 20 to 25 years (Fig. 1). Recent annual counts have stabilized or increased slightly since 1979 (Fig. 2).

Spring chinook redd counts on the Salmon River in 1985 totaled 533, a 75.3% increase over the 1984 redd count, and a 23.1% increase over the last 5-year average (Table 1). However, the total number of spring

Table 1. Salmon River drainage chinook salmon redd counts for 1985 and previous 5-year average, 1980-84.

Streams	1980	1981	1982	1983	1984	5-year average	1985
<u>Spring Chinook</u>							
Alturas Lake Creek	7	4	9	27	3	10	7
Upper Salmon River ^a	47	363	42	161	71	137	76
Upper Valley Creek	6	2	1	8	6	5	1
Upper Yankee Fork	0	16	0	0	NC	4	5
Upper East Fork ^b	6	76	28	121	NC	58	NC
Herd Creek	0	9	1	7	0	3	1
Marsh Creek drainage	9	63	40	33	60	41	108
Lemhi River	47	126	163	50	35	84	93
North Fork Salmon River	NC	NC	NC	NC	NC	--	NC
Bear Valley Creek	15	60	39	56	55	45	134
Elk Creek	8	23	9	38	27	21	28
Sulphur Creek	2	7	3	8	0	4	10
Upper Big Creek	<u>4</u>	<u>22</u>	<u>7</u>	<u>27</u>	<u>42</u>	<u>20</u>	<u>70</u>
Subtotal	151	771	342	536	299	432	533
<u>Summer Chinook</u>							
Lower Big Creek	NC	NC	NC	NC	NC	--	14
Lower Salmon River	11	75	39	111	51	57	126
Lower Valley Creek	4	17	8	28	15	14	1
Lower East Fork	0	43	14	27	16	20	22
Loon Creek	9	30	23	7	4	15	28
South Fork Salmon R.	116	126	111	185	165	141	323
Johnson Creek	24	45	37	63	17	37	75
Secesh R. & Lake Creek	<u>20</u>	<u>53</u>	<u>65</u>	<u>98</u>	<u>21</u>	<u>51</u>	<u>105</u>
Subtotal	184	389	297	519	289	335	694
<u>Unclassified Spawners</u>							
Camas Creek	17	65	33	38	11	33	21
Lower Yankee Fork	0	4	1	0	NC	1	0
West Fork Yankee Fork	<u>2</u>	<u>19</u>	<u>0</u>	<u>7</u>	<u>0</u>	<u>6</u>	<u>1</u>
Subtotal	19	88	34	45	11	40	22
Total	354	1,248	673	1,100	599	807	1,249

^aReduced by trapping at Sawtooth Hatchery site, 1982-85.

^bAll spawners trapped at East Fork weir, 1984 and 1985.

NC No count.

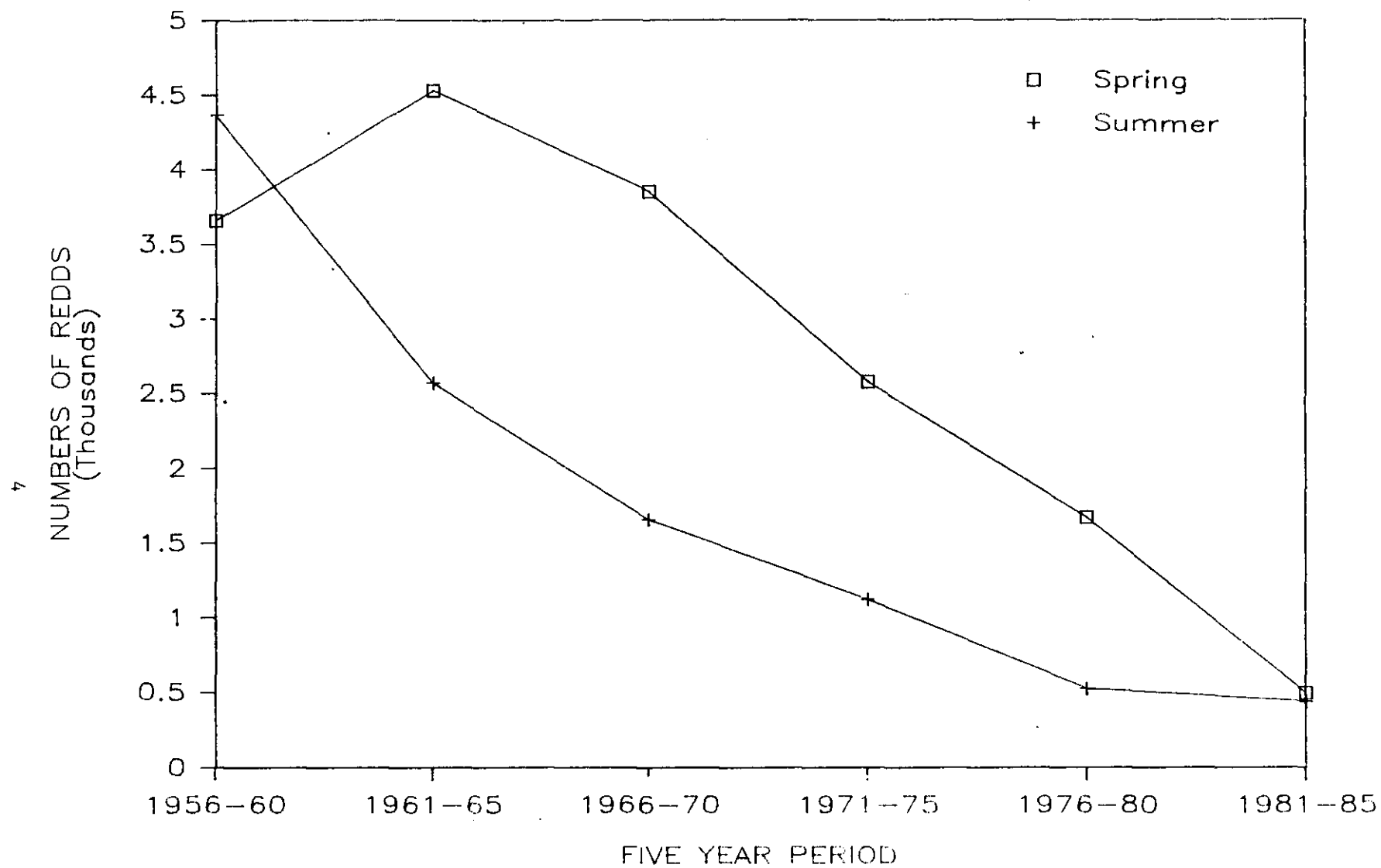


Figure 1. Total Salmon River chinook redd 5-year averages, 1956-1985.

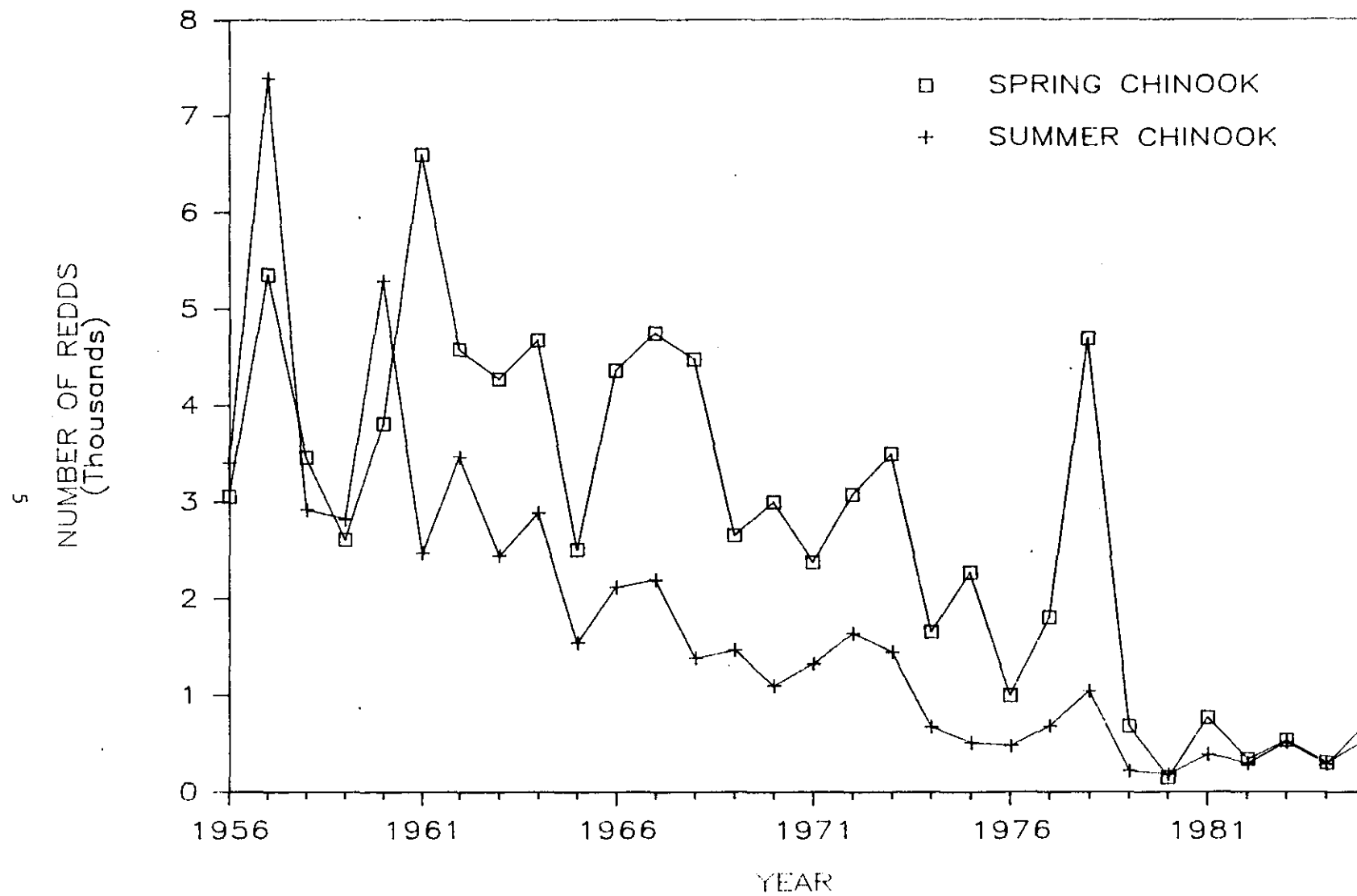


Figure 2. Annual Salmon River chinook redd counts, 1956-1985.

chinook returning to the Salmon River this year was the fourth lowest count on record, and was smaller than the 1981 parent generation (Table 2).

Summer chinook redd counts on the Salmon River reached their highest since 1978 (Table 3). Compared to the 1984 counts, summer chinook redd counts in 1985 increased 2.4 fold, and more than doubled the previous 5-year average (Table 1).

Summer chinook redd counts exceeded spring chinook redd counts for the first time since 1960 (Fig. 2). Overall, spring and summer chinook redd counts increased in 1985 over the 1984 counts as well as the previous 5-year average (Table 1).

Fork length of spring and summer chinook kelts sampled during spawning ground surveys on the South Fork Salmon, the Secesh River, Lake Creek (Secesh River), and upper Big Creek are reported in Tables 4-6. Summer chinook kelts recovered in the South Fork Salmon River totaled 116 and were comprised mainly of 4-year-old adults (Table 4). Five-year-old fish made up 26.8% of the recovered carcasses, and jack salmon made up 9.6%. Three of the carcasses recovered on spawning grounds had coded wire tags. Of the live salmon observed during the spawning ground survey on the South Fork, 136 were 4 years old, 9 were 5 years old, and Jacks totaled 40.

A total of 27 summer chinook kelts were recovered from the Secesh River and Lake Creek (Table 5). One kelt had a coded wire tag. Four-year-old adults made up 85.2% of the total and the remaining 14.8% was comprised of 5-year-old adults. No Jack salmon carcasses were recovered. A total of 16 live summer chinook were reported during the spawning ground survey. Four-year-old adults made up 87.5% of the live fish observed, and 5-year-old adults comprised the remaining 12.5%. No live Jack salmon were observed.

Four spring chinook carcasses were recovered from Big Creek of the Middle Fork Salmon River (Table 6). The total was made up of two 4-year-old and two 5-year-old adults. No Jack salmon carcasses were observed. One live Jack spring chinook salmon and five 4-year-old adults were also observed during the spawning ground survey.

Clearwater River Drainage

Spring chinook redd counts in the Clearwater River basin have been increasing at a gradual rate over the past 20 years. Figure 3 illustrates this upward trend in spring chinook redds using 5-year averages from 1966 to 1985 (Table 7). A total of 333 redds were counted this year in the Clearwater River basin, surpassing all counts since 1978. Compared with the previous 5-year average, the 1985 redd counts increased by 44.0% (Table 8).

Table 2. Salmon River drainage spring chinook redd counts, 1956-1965.

Year	Alturas Lake Creek ^a	Bear Valley Creek	Elk Creek	Lemhi River	Marsh Creek Drainage	Sulphur Creek	Upper East Fork ^b	Upper Salmon River ^a	Upper Valley Creek	Upper Yankee Fork	Upper Big Creek	Hard Creek	N.F. Salmon River	Five- year average
1985	7	134	28	93	108	10	NC	76	1	5	70	1	NC	
1984	3	55	27	35	60	0	NC	71	6	NC	42	0	NC	
1983	27	56	38	50	33	8	121	161	8	0	27	7	NC	496
1982	9	39	9	163	40	3	28	42	1	0	7	1	NC	
1981	4	60	23	126	63	7	76	363	2	16	22	9	NC	
1980	7	15	8	47	9	2	6	47	6	0	4	0	NC	
1979	29	69	49	154	47	15	57	205	25	18	15	2	NC	
1978	303	184	208	796	270	64	841	1,707	141	33	95	26	29	1,670
1977	85	128	86	474	98	5	168	698	18	6	9	6	31	
1976	16	76	61	241	48	14	75	378	NC	40	22	27	6	
1975	60	215	169	366	201	50	348	509	189	60	77	11	14	
1974	42	130	108	215	210	30	346	338	127	54	28	13	18	
1973	153	387	369	485	518	78	665	414	125	104	96	47	55	2,576
1972	143	221	212	507	312	71	448	748	182	115	60	28	31	
1971	50	108	173	407	281	58	370	619	89	57	32	49	53	
1970	68	334	302	371	456	93	468	432	202	67	68	47	95	
1969	41	356	349	360	235	138	174	313	350	53	90	43	155	
1968	110	574	483	589	466	142	622	637	330	234	90	57	145	3,851
1967	74	445	420	804	650	134	614	943	253	250	67	32	66	
1966	119	534	525	819	406	142	511	699	219	112	127	79	70	
1965	101	301	203	454	404	43	138	472	204	77	75	31	5	
1964	80	576	425	1,151	709	97	405	706	199	146	51	49	86	
1963	86	460	654	364	372	332	646	638	141	128	161	202	71	4,529
1962	138	484	426	1,455	345	169	334	638	157	60	231	58	84	
1961	30	675	384	1,871	546	239	818	813	227	192	382	283	144	
1960	33	386	346	1,434	316	79	122	720	83	43	159	—	91	
1959	18	381	516	524	95	100	223	502	24	10	96	—	121	
1958	107	341	410	675	262	131	427	535	75	38	140	—	322	3,660
1957	110	791	398	1,023	458	381	572	1,118	225	47	233	—	—	
1956	101	1,085	525	425	229	88	—	606	—	—	—	—	—	

^aReduced by trapping at Sawtooth Hatchery site, 1981-85.

^bReduced by trapping at East Fork weir, 1984, 1985.

Table 3. Salmon River drainage summer chinook redd counts, 1956-1985.

Year	Lower Salmon River	Lower Valley Creek	Lower East Fork	Loon Creek	S. Fork Salmon River	Johnson Creek	Secesh River Lake Cr.	Lower Big Creek	Five year average
1985	126	1	22	28	323	75	105	14	
1984	51	15	16	4	165	17	21	NC	
1983	111	28	27	7	185	63	98	NC	438
1982	39	8	14	23	111	37	65	NC	
1981	75	17	43	30	126	45	53	NC	
1980	11	4	0	9	116	24	20	NC	
1979	NC	15	33	NC	115	36	20	NC	
1978	349	219	NC	29	251	113	91	--	
1977	94	63	136	62	226	81	27	--	525
1976	44	43	39	31	241	68	17	--	
1975	45	80	38	32	238	69	10	--	
1974	200	45	49	34	218	107	21	--	
1973	224	77	138	78	586	271	74	--	
1972	412	39	161	150	577	220	87	NC	1,122
1971	220	147	149	79	421	183	80	52	
1970	150	41	123	43	527	130	63	23	
1969	120	22	138	110	636	273	104	72	
1968	223	63	235	135	515	127	58	33	
1967	365	79	234	96	902	286	140	94	1,656
1966	390	184	216	49	980	110	140	51	
1965	201	57	131	166	656	116	134	83	
1964	415	71	306	361	1,124	310	181	121	
1963	195	50	265	261	1,057	266	163	220	
1962	467	115	195	157	1,589	295	292	360	2,570
1961	356	162	198	131	1,058	207	198	160	
1960	818	141	303	334	2,306	517	524	352	
1959	336	70	192	123	1,305	294	285	217	
1958	362	47	--	193	1,236	269	478	338	4,367
1957	2,406	331	183	425	2,812	349	344	535	
1956	384	--	--	286	2,084	386	269	--	

Table 4. Length frequency of summer chinook carcasses recovered on South Fork Salmon River spawning ground surveys, 1985.

Fork length (inches)	Above trap				Below trap				Total	% total	Age class break- down
	Unmarked		Adipose clip & tag number		Unmarked		Adipose clip & tag number				
M	F	M	F	M	F	M	F				
19	2	0	0	0	1	0	0	0	3	2.6	JACKS N=11 %=9.6
20	2	0	0	0	2	0	0	0	4	3.5	
21	2	0	0	0	2	0	0	0	4	3.5	
22	0	0	0	0	2	0	0	0	2	1.7	4-YEARS OLD N=74 %=63.6
23	1	0	0	0	0	0	0	0	1	0.9	
24	0	0	0	0	2	0	0	0	2	1.7	
25	1	0	0	0	0	0	0	0	1	0.9	
26	0	0	0	0	0	0	0	0	0	0.0	
27	0	0	0	0	0	0	0	0	0	0.0	
28	2	0	0	0	1	2	0	0	5	4.3	
29	10	0	0	0	0	2	0	0	12	10.3	
30	3	4	0	0	7	2	0	0	16	13.8	
31	4	4	0	0	0	2	0	1 (G1291)	11	9.45	
32	5	3	0	0	14	2	0	0	24	20.7	
33	2	3	0	0	6	2	0	0	13	11.2	5-YEARS OLD N=31 %=26.8
34	1	1	0	0	5	1	0	0	8	6.9	
35	0	0	0	0	0	1	0	0	1	0.9	
36	0	0	0	0	2	0	0	0	2	1.7	
37	1	0	0	0	2	0	0	0	3	2.6	
38	0	0	0	0	2	0	0	1 (G1290)	3	2.6	
39	0	0	0	0	0	0	0	0	0	0.0	
40	0	0	0	0	0	0	0	0	0	0.0	
41	0	0	0	0	0	0	0	1 (G1297)	1	0.9	
Total	36	15	0	0	48	14	0	3	116		

Table 5. Length frequency of summer chinook carcasses recovered on Secesh River and Lake Creek spawning ground surveys, 1985.

Fork length (Inches)	Lake Creek				Secesh River				Total	% total	Age class break- down
	Unmarked		Adipose clip & tag number		Unmarked		Adipose clip & tag number				
	M	F	M	F	M	F	M	F			
19	0	0	0	0	0	0	0	0	0	0.0	JACKS N=0 %=0.0
20	0	0	0	0	0	0	0	0	0	0.0	
21	0	0	0	0	0	0	0	0	0	0.0	
22	0	0	0	0	1	0	0	0	1	3.7	4-YEARS OLD N=23 %=85.2
23	0	0	0	0	0	0	0	0	0	0.0	
24	0	0	0	0	0	0	0	0	0	0.0	
25	0	0	0	0	0	0	0	0	0	0.0	
26	0	0	0	0	0	0	0	0	0	0.0	
27	0	0	0	0	0	0	0	0	0	0.0	
28	0	0	0	0	0	0	0	0	0	0.0	
29	1	1	0	0	1	1	0	0	4	14.8	
30	1	1	0	0	2	2	1 (G1300)	0	7	26.0	
31	1	1	0	0	2	2	0	0	6	22.2	
32	2	1	0	0	1	1	0	0	5	18.5	
33	0	0	0	0	1	0	0	0	1	3.7	5-YEARS OLD N=4 %=14.8
34	1	0	0	0	0	0	0	0	1	3.7	
35	0	0	0	0	0	1	0	0	1	3.7	
36	0	0	0	0	0	0	0	0	0	0.0	
37	0	0	0	0	1	0	0	0	1	3.7	
38	0	0	0	0	0	0	0	0	0	0.0	
39	0	0	0	0	0	0	0	0	0	0.0	
40	0	0	0	0	0	0	0	0	0	0.0	
41	0	0	0	0	0	0	0	0	0	0.0	
Total	6	4	0	0	9	7	1	0	27		

Table 6. Length frequency of spring chinook carcasses recovered on Big Creek (Middle Fork Salmon River) spawning ground surveys, 1985.

Fork length (inches)	Male		Female		Total	% total	Age class break- down
	Unmarked	Adipose clip & tag number	Unmarked	Adipose clip & tag number			
19	0	0	0	0	0	0.0	JACKS N=0 %=0.0
20	0	0	0	0	0	0.0	
21	0	0	0	0	0	0.0	
22	0	0	0	0	0	0.0	4-YEARS OLD N=2 %=50.0
23	0	0	0	0	0	0.0	
24	0	0	0	0	0	0.0	
25	0	0	0	0	0	0.0	
26	0	0	0	0	0	0.0	
27	0	0	0	0	0	0.0	
28	0	0	0	0	0	0.0	
29	0	0	0	0	0	0.0	
30	1	0	0	0	1	25.0	
31	1	0	0	0	1	25.0	
32	0	0	0	0	0	0.0	5-YEARS OLD N=2 %=50.0
33	0	0	0	0	0	0.0	
34	0	0	0	0	0	0.0	
35	0	0	1	0	1	25.0	
36	0	0	0	0	0	0.0	
37	0	0	0	0	0	0.0	
38	1	0	0	0	1	25.0	
39	0	0	0	0	0	0.0	
40	0	0	0	0	0	0.0	
41	0	0	0	0	0	0.0	
Total	3	0	1	0	4		

Table 7. Annual Clearwater River aerial and ground chinook redd counts and 5—year averages, 1966—1985.

Year	Selway River	Bear Creek	Running Creek	Whitecap Creek	Hoosa Creek	Selway Riv. drainage		Crooked Fork	Brushy Fork	Lochsa River drainage		Newsome Creek	Crooked River	Red River	American River	South Fork drainage		Clearwater River drainage	
						Total	5-yr. avg.			Total	5-yr. avg.					Total	5-yr. avg.	Total	5-yr. avg.
1985	15	NC	NC	NC	NC	15		47	14	61		2	10	222	23	257		333	
1984	30	6	NC	6	7	49		28	9	37		1	22	175	NC	198		284	
1983	28	8	NC	4	6	44	45	7	6	13	43	7	12	193	9	221	192	278	280
1982	38	8	NC	3	5	54		34	17	51		5	2	159	21	167		292	
1981	47	8	NC	4	6	65		27	25	52		3	3	80	12	98		215	
1980	40	7	1	3	4	55		16	10	26		5	8	38	7	58		139	
1979	21	3	0	2	4	30		6	12	18		6	2	20	—	28		76	
1978	125	13	6	NC	17	161	96	37	25	62	53	22	40	64	—	126	81	348	230
1977	57	18	2	1	23	141		80	15	95		28	71	82	—	159		395	
1976	58	14	3	4	15	94		49	13	62		5	13	15	—	33		189	
1975	21	5	0	1	4	31		31	4	35		6	33	20	—	59		125	
1974	66	10	4	2	15	97		22	6	28		3	5	12	—	20		145	
1973	261	26	21	7	32	347	157	60	—	60	31							407	204
1972	175	25	11	8	13	232		32	—	32								264	
1971	55	14	8	NC	—	77		1	—	1								78	
1970	65	19	10	4	—	98		34	—	34								132	
1969	57	6	21	—	—	84		112	—	112								196	
1968	16	7	4	—	—	27	56	15	—	15	34							42	90
1967	22	7	—	—	—	29		0	—	0								29	
1966	36	8	—	—	—	44		7	—	7								51	

Table 8. Clearwater River drainage spring chinook salmon redd counts and previous 5-year average, 1973—1985.

Streams	Method of survey	Number of redds counted in												5-yr. avg.	
		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	
<u>Selway drainage</u>															
Running Creek	Aerial	21	4	0	3	2	6	0	1	NC	NC	NC	NC	—	NC
Selway River	Aerial	261	66	21	58	97 ^b	125 ^b	21 ^b	40 ^b	47 ^b	38 ^b	26 ^b	30 ^d	36	15 ^b
Bear Creek	Aerial	26	10	5	14	18	13	3	7	8	8	8	6	7	NC
White Cap Creek	Aerial	7	2	1	4	1	NC	2	3	4	3	4	6	4	NC
Moose Creek	Aerial	32	15	4	15	23	17	4	4	6	5	6	7	6	NC
Subtotal		347	97	31	94	141	161	30	55	65	54	44	49	53	15
<u>Lochsa drainage</u>															
Crooked Fork	Ground	60	22	31 ^a	49 ^a	80 ^b	37	6	16	27	34	7	28	22	47
Brushy Fork	Aerial	NC	6	4	13	15	25	12	10	25	17 ^d	6 ^d	9 ^d	13	14 ^d
Subtotal		60	28	35	62	95	62	18	26	52	51	13	37	35	61
<u>South Fork drainage</u>															
Newsome Creek	Ground	NC	3	6 ^a	5 ^a	26 ^b	22 ^b	6	5	3	5 ^a	7 ^a	1	4	2
Crooked River	Ground	NC	5	33 ^a	13 ^a	71 ^b	40 ^b	2	8	3	2	12	22	9	10 ^a
Red River	Aerial	NC	12	20	15	62 ^b	64 ^b	20	38 ^c	80 ^c	159	193	175 ^d	129	222
American River	Aerial	NC	NC	NC	NC	NC	NC	NC	7	12	21	9	NC	—	23
Subtotal		—	20	59	33	159	126	28	58	98	187	221	198	142	257
Total		407	145	125	189	395	349	76	139	215	292	278	284	230	333

^aAerial count rather than ground.

^bNo duplication of aerial and ground counts during these years, so aerial and ground counts were combined.

^cNew section added from Ditch Creek to Otterson Creek.

^dGround count rather than aerial.

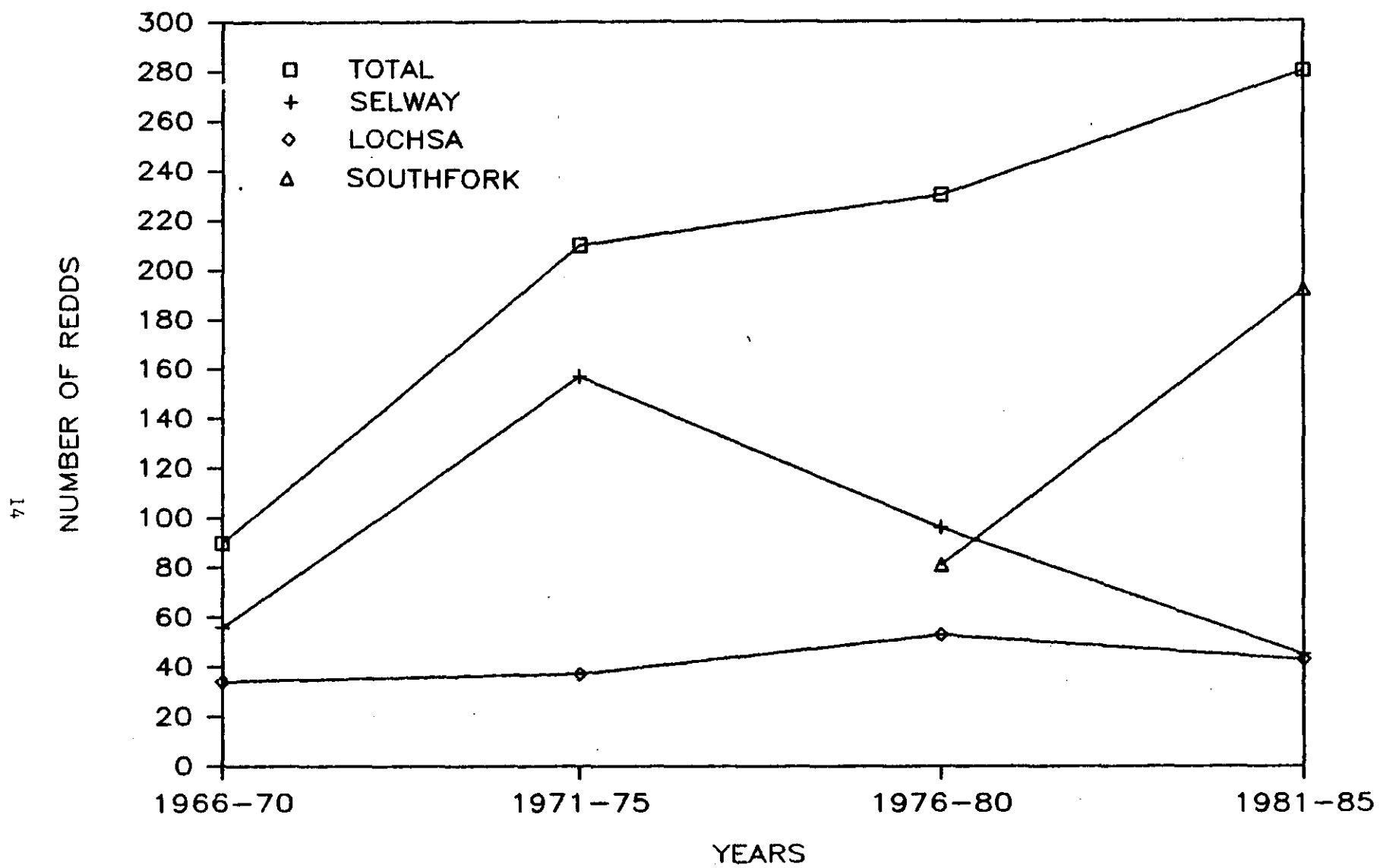


Figure 3. Clearwater drainage chinook salmon redd counts, and five-year averages, 1966-1985.

South Fork Clearwater Drainage

Total redd counts in the South Fork Clearwater basin reached their highest since the spawning ground survey began in 1974. Redd counts remained low on Newsome Creek this year and appear to have declined on Crooked River. Counts on American River, however, were the highest on record.

Length frequency distribution of 211 chinook carcasses recovered in 1985 from the Red River weir and spawning ground survey is listed in Table 9.

Lochsa Drainage

Spring chinook redd counts in the Lochsa drainage in 1985 were up by 65.0% over last year's total redd count (Table 7). Redd counts on Crooked Fork surpassed the last seven years and more than doubled the previous 5-year average (Table 8). The 1981-85 average for the Lochsa drainage was down slightly from the 1976-80 average (Table 7, Fig. 3).

Selway Drainage

Inclement weather prevented aerial spawning ground surveys of the Selway River drainage this year. A total of 15 redds were observed in a section of the main Selway River by ground survey in 1985, compared to seven redds which were observed from ground surveys in 1984. The last eight years of redd count estimates in the Selway drainage were made, however, by combining ground and aerial survey counts which were not duplicated. Expansion of the 1985 count by using the previous five years of ground/aerial ratio would result in a redd count estimate of 40. Overall, little change has been observed in the Selway drainage for the 5-year averages of 1979-83 and 1980-84.

SOCKEYE SALMON

From 1954 to 1966, sockeye salmon were counted at the Redfish Lake Creek weir. Ground counts of redds were conducted from 1981 to 1985. A temporary weir was placed in Redfish Lake Creek in 1985 to count sockeye salmon into Redfish Lake. A total of 14 sockeye were counted at the weir. One pair was spawned artificially for hatchery experimentation. A survey around Sandy Beach boat ramp reported no adult sockeye or redds.

Table 9. Length frequency of spring chinook carcasses measured at Red River weir and recovered from Red River spawning surveys during 1985.

Fork length (inches)	Total number of fish	Percent total	Age class breakdown
16	0	0.0	
17	1	0.5	JACKS
18	1	0.5	N=2
19	0	0.0	%=1.0
20	0	0.0	
21	0	0.0	
22	0	0.0	
23	0	0.0	
24	3	1.4	
25	1	0.5	4-YEARS
26	6	2.9	OLD
27	2	1.0	N=33
28	6	2.9	%=15.6
29	7	3.3	
30	3	1.4	
31	1	0.5	
32	4	1.9	
33	3	1.4	
34	21	10.0	
35	17	8.1	
36	30	14.3	
37	29	13.8	5-YEARS
38	18	8.6	OLD
39	15	7.1	N=176
40	15	7.1	%=83.4
41	11	5.2	
42	12	5.7	
43	3	1.4	
44	2	0.5	
45	0	0.0	
Total	211		

LEGEND

Ground Survey Sections

Aerial Survey Sections

Ground Redd Counts

Aerial Redd Counts

Aerial-Ground Check Areas

Aerial-Ground Check Area Count

Migratory Block

Road

Trail

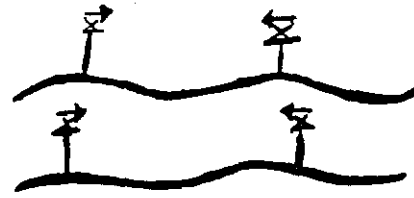
Forest Service Stations

Landing Strip

Fence

Pack Bridge

Highway Bridge



(4)

(3)



*



X X X X X



A P P E N D I X A

DRAINAGE Salmon River

STREAM South Fork Salmon River

OBSERVATION CONDITIONS: good

TIMING Early, On Time, Late

SURVEY DATE 8/31/85

MAP SCALE 1" = 1 Mile

OBSERVER Anderson

Holding mortality at South Fork trap:

Males	151
Jacks	37
Females	91

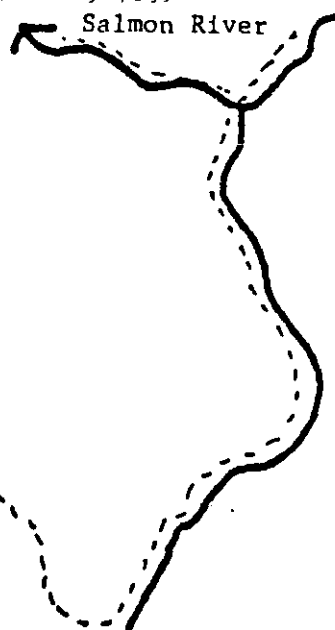
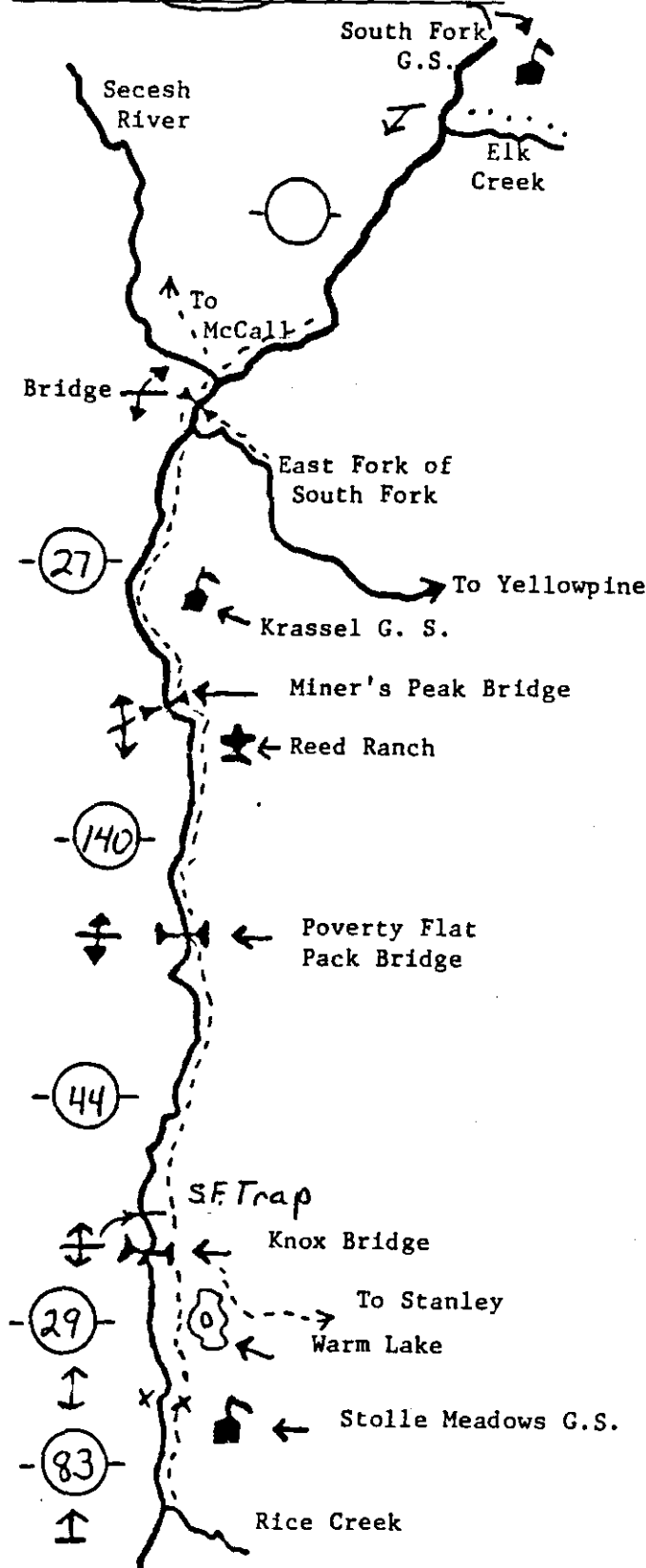
Number of salmon released above the South Fork Salmon trap:

Males	208
Jacks	165
Females	400
Total	773

Number of salmon spawned (killed) at trap site:

Males	(information not available)
Females	477

Total Trap count: 2,237
Total egg take: 2,073,546



DRAINAGE S. F. Salmon River

SURVEY DATE 8/24/85

STREAM Secesh and Lake Creek

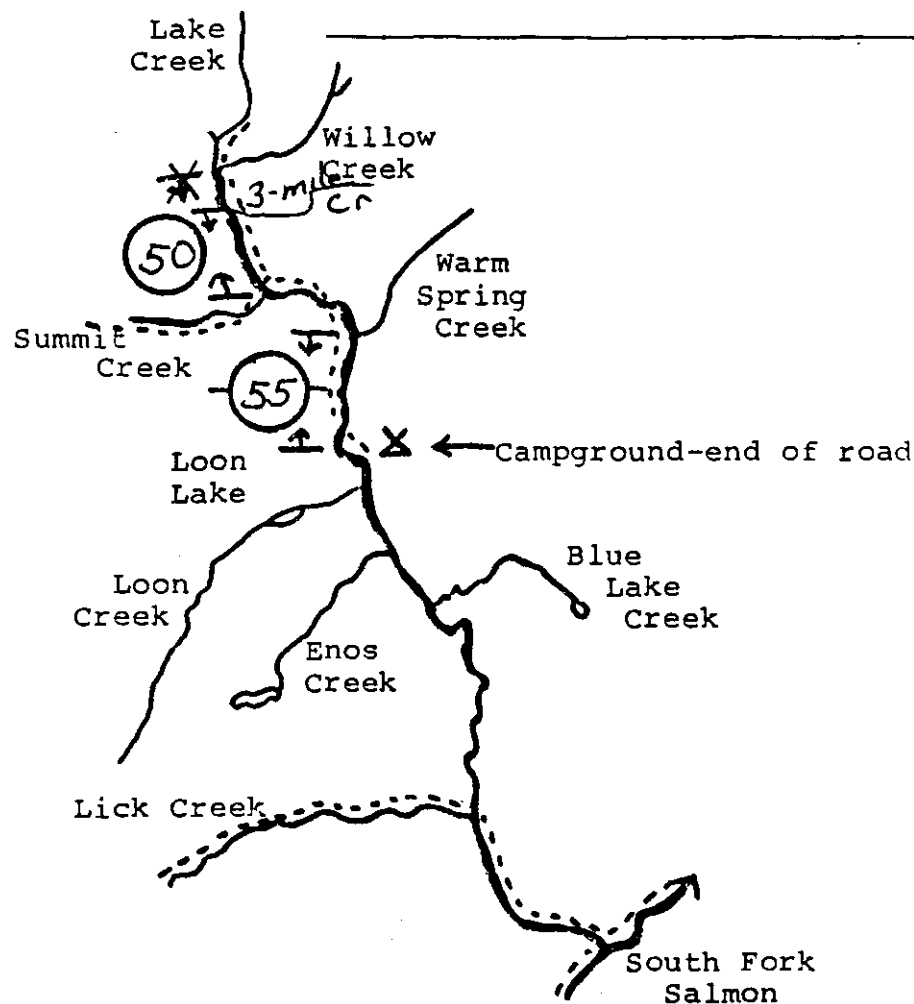
MAP SCALE 1" = 4 miles

OBSERVATION CONDITIONS good

OBSERVER Anderson

TIMING: Early On Time Late (mark one)

REMARKS: _____



DRAINAGE E. F. of South Fork

SURVEY DATE

8/31/85

STREAM Johnson Creek

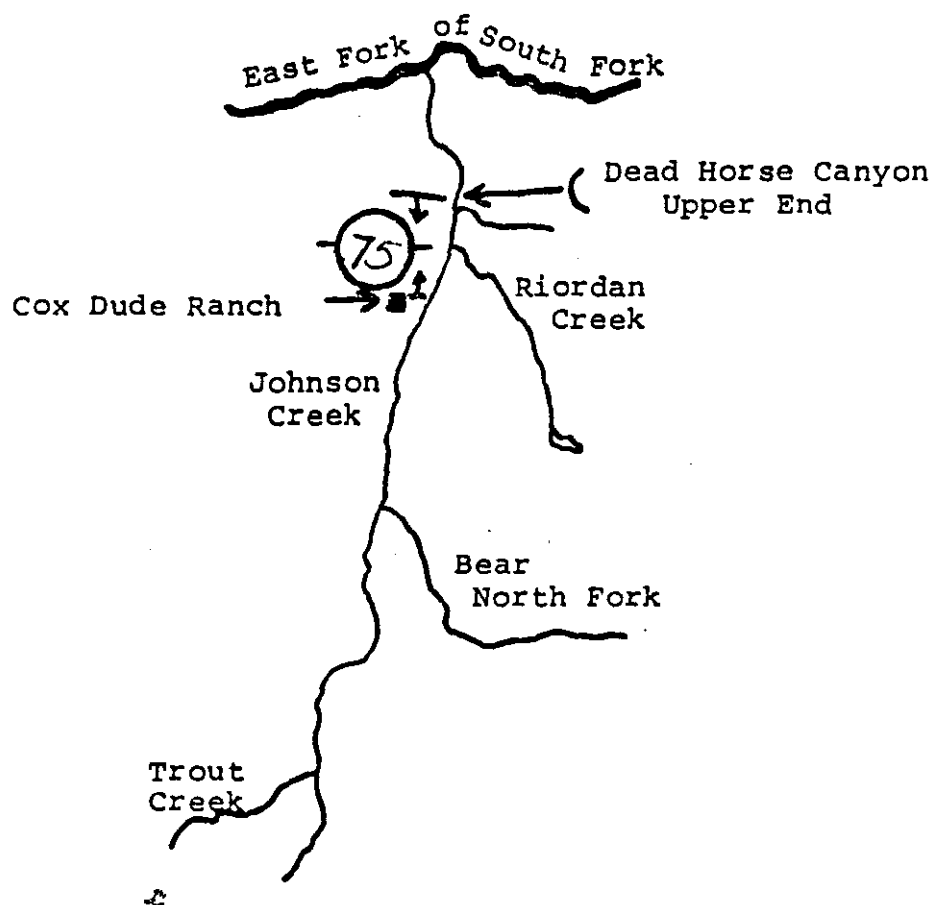
MAP SCALE 1" = 4 miles

OBSERVATION CONDITIONS good

OBSERVER Anderson

TIMING: Early On Time Late (mark one)

REMARKS:



DRAINAGE M. F. Salmon River

SURVEY DATE 8/22/85

STREAM Bear Valley Creek

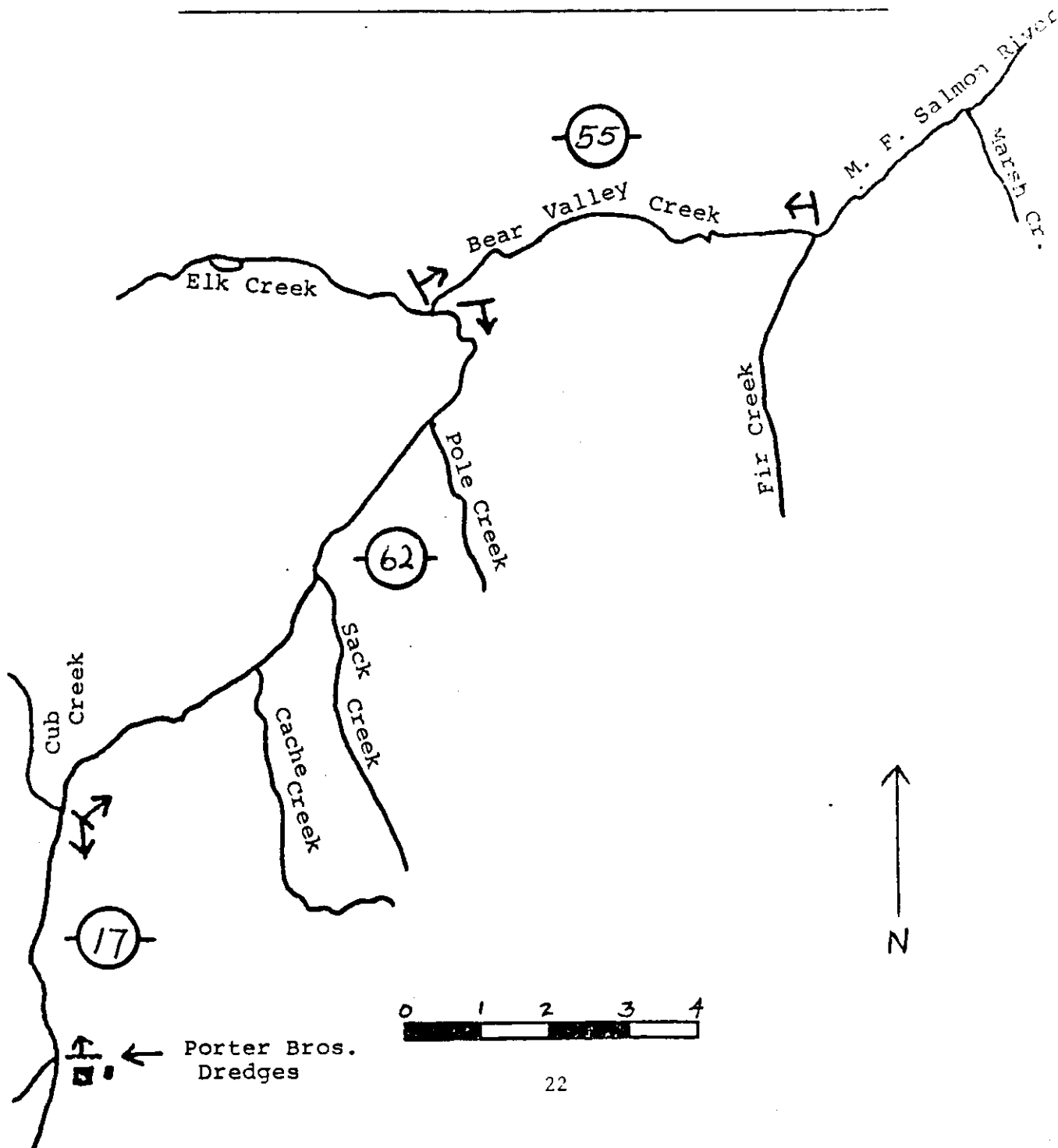
MAP SCALE 1" = 2 miles

OBSERVATION CONDITIONS good

OBSERVER Anderson

TIMING: Early On Time Late (mark one)

REMARKS: _____



DRAINAGE M. F. Salmon River

SURVEY DATE 9/22/85

STREAM Elk Creek

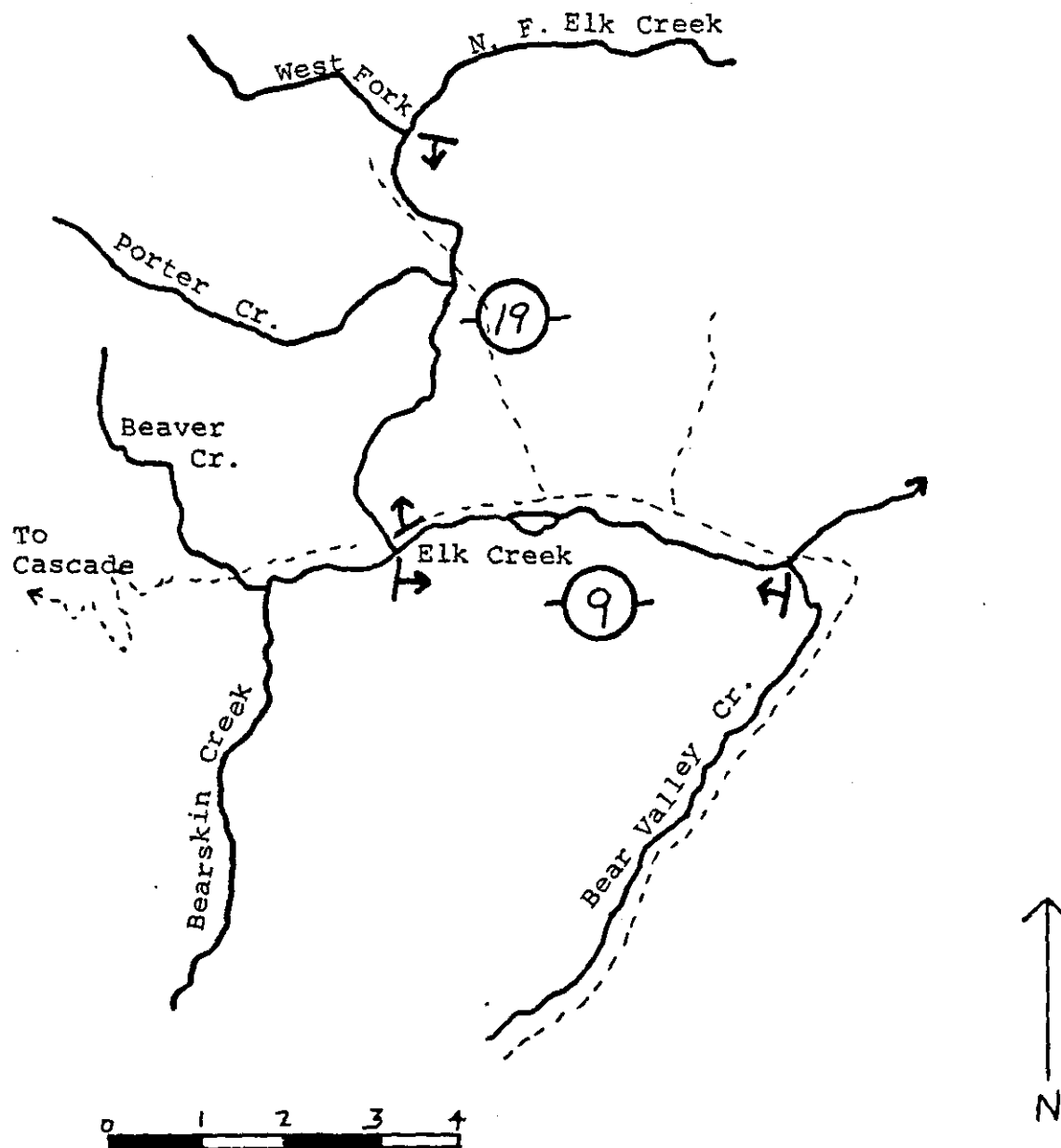
MAP SCALE 1" = 2 miles

OBSERVATION CONDITIONS good

OBSERVER Anderson

TIMING: Early On Time Late (mark one)

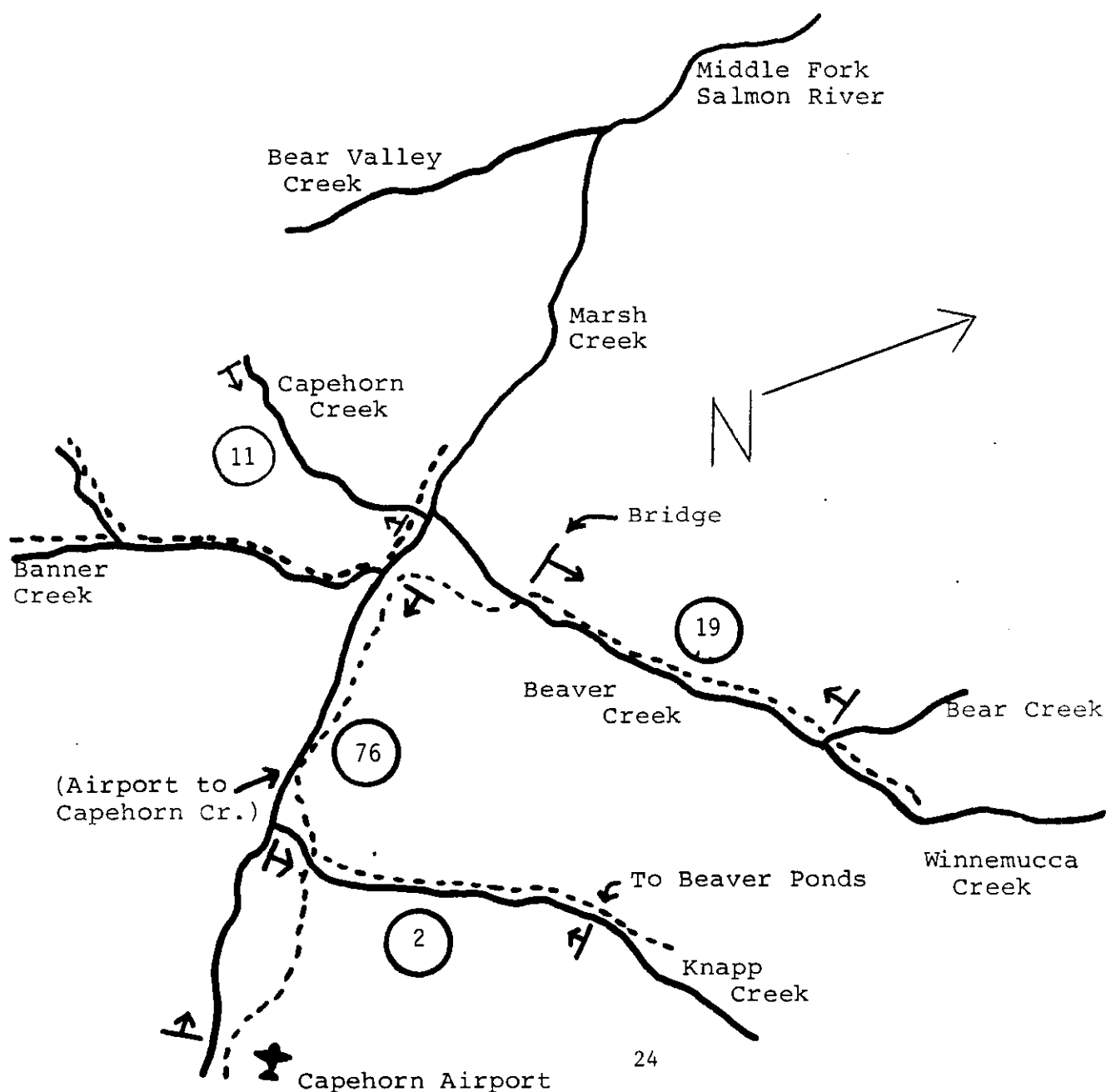
REMARKS: _____



DRAINAGE M. F. Salmon River SURVEY DATE September 5, 1985
Marsh, Beaver, Knapp,
STREAM Capehorn Creeks MAP SCALE 2/3" - 1 mile
OBSERVATION CONDITIONS sunny and clear OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Ground counts



DRAINAGE M. F. Salmon River

SURVEY DATE 8/22/85

STREAM Sulphur Creek

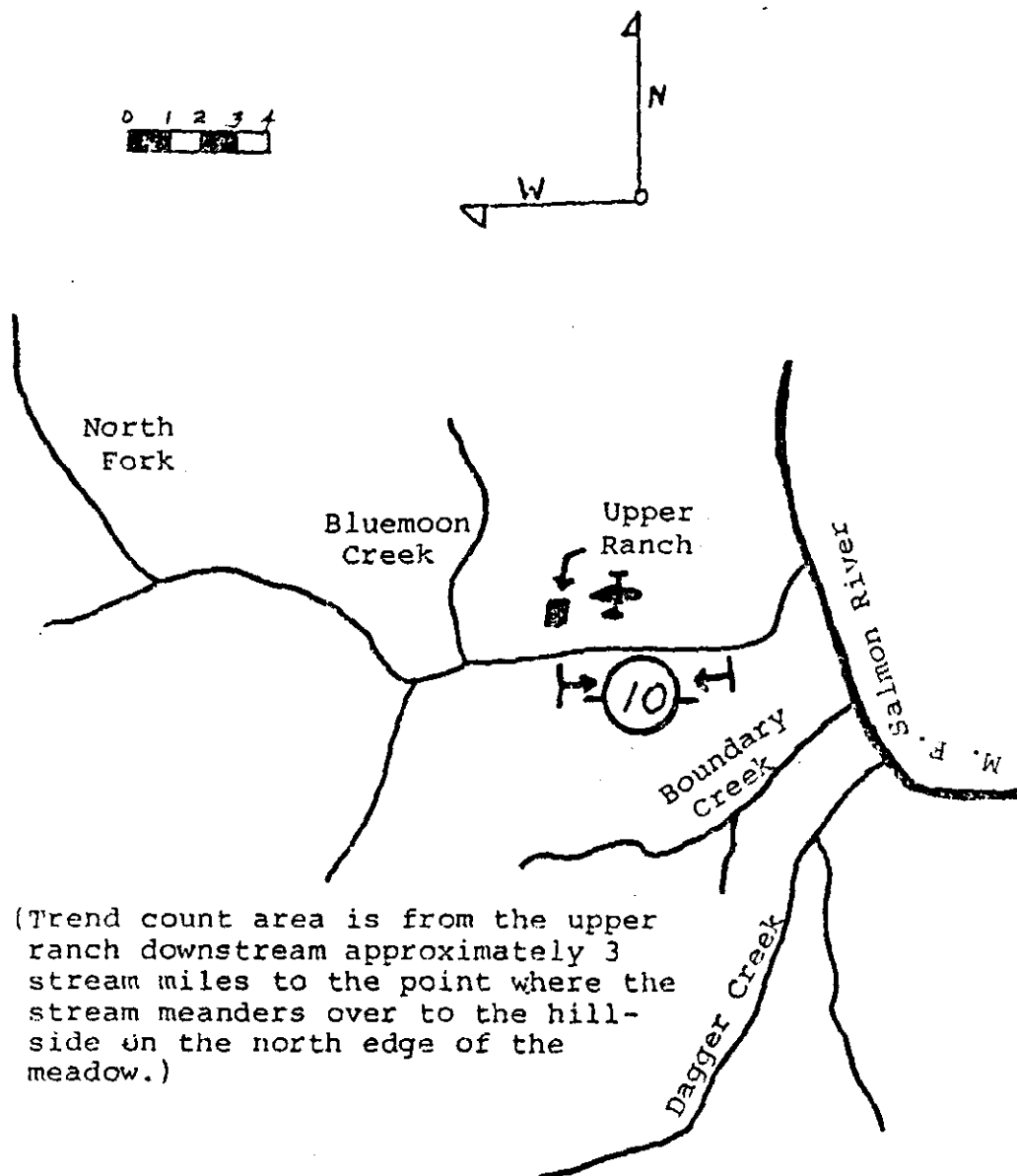
MAP SCALE 1/6" = 1 mile

OBSERVATION CONDITIONS good

OBSERVER Anderson

TIMING: Early On Time Late (mark one)

REMARKS: _____



DRAINAGE Middle Fork Salmon River

SURVEY DATE September 6, 1985

STREAM Loon Creek

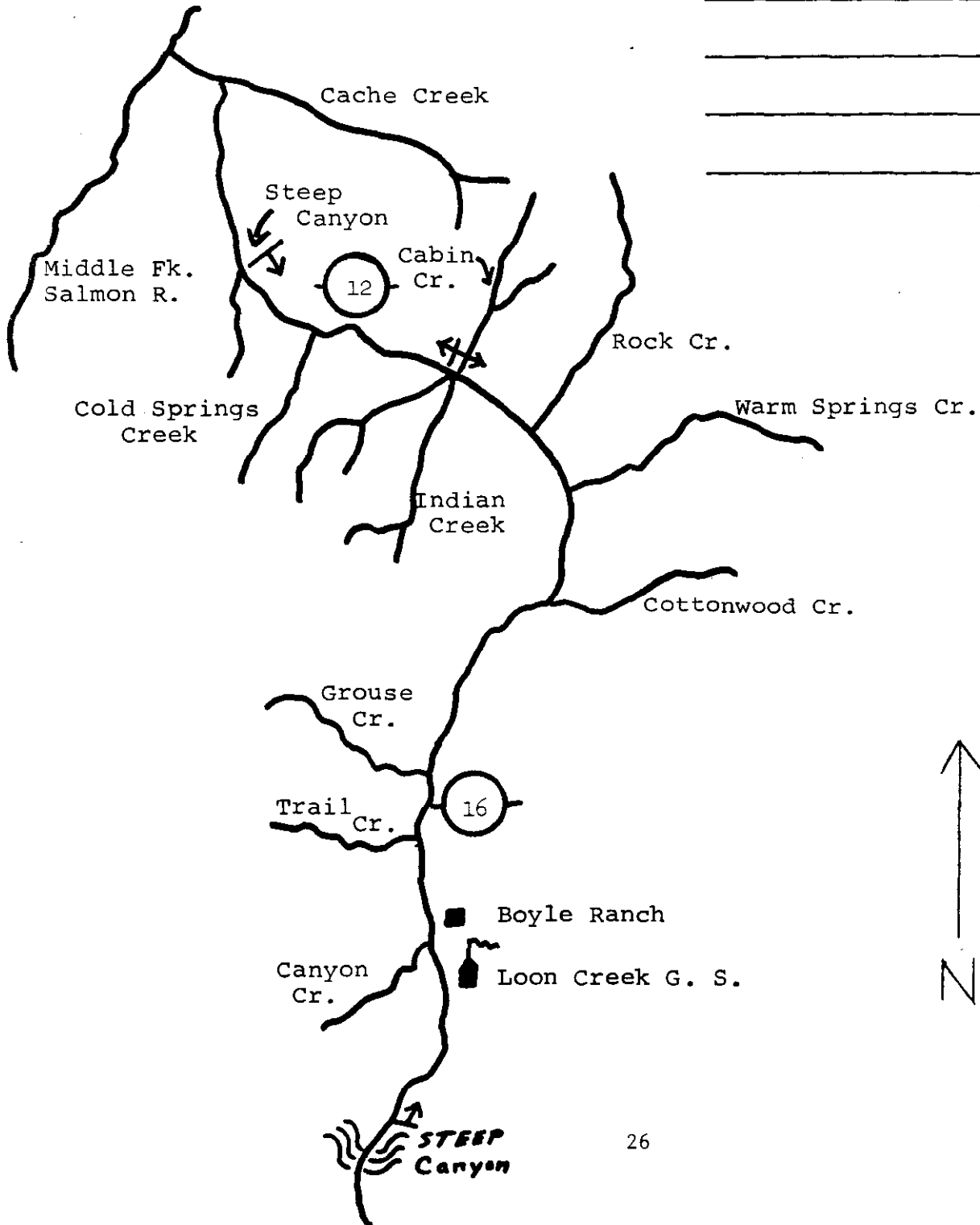
MAP SCALE 1/3" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early ☐ On Time ☒ Late (mark one)

REMARKS: Helicopter



DRAINAGE M. F. Salmon River

SURVEY DATE September 5, 1985

STREAM Camas Creek

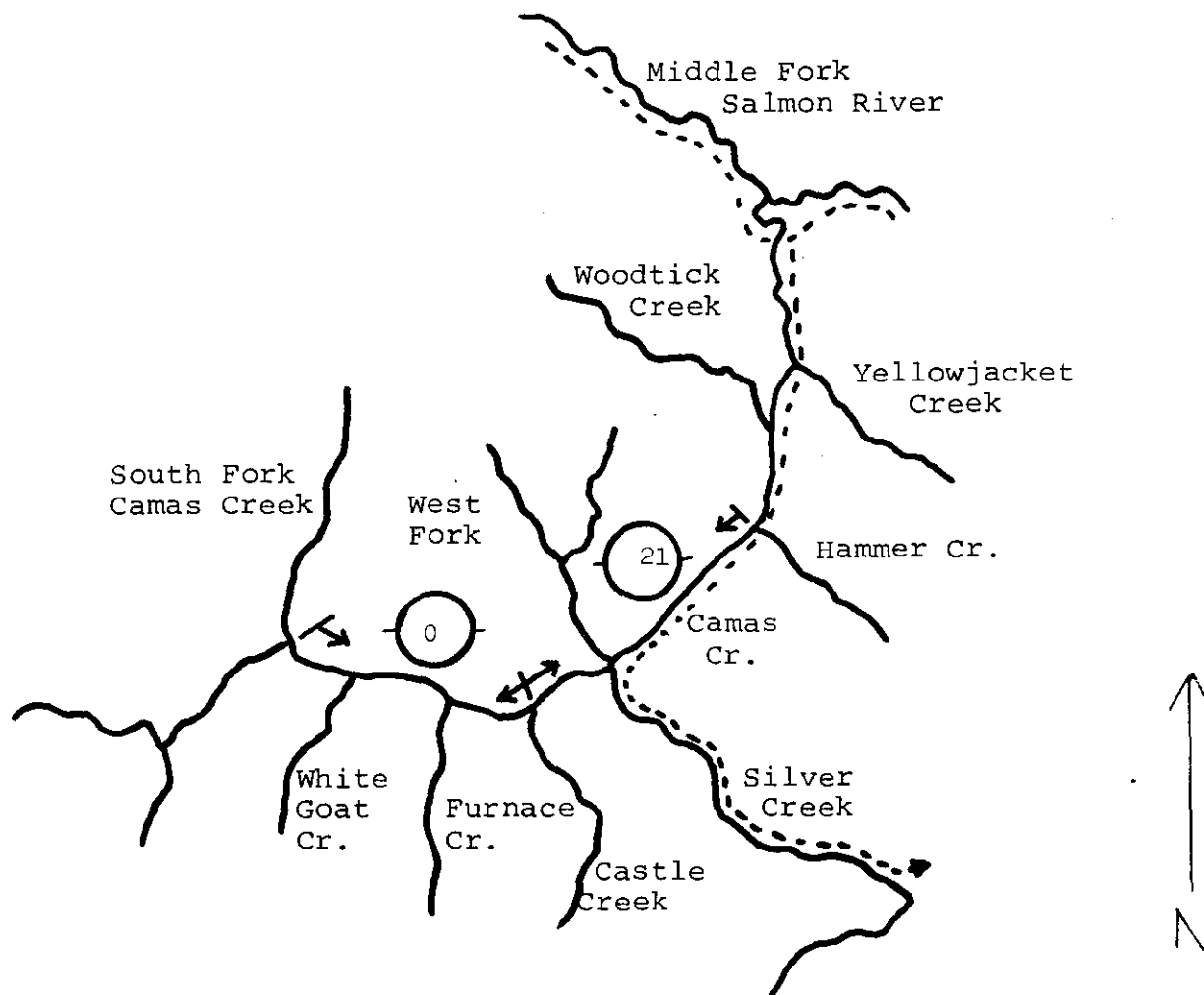
MAP SCALE 1/4" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Helicopter



DRAINAGE M. F. Salmon River

SURVEY DATE 8/23/85

STREAM Big Creek (Upper)

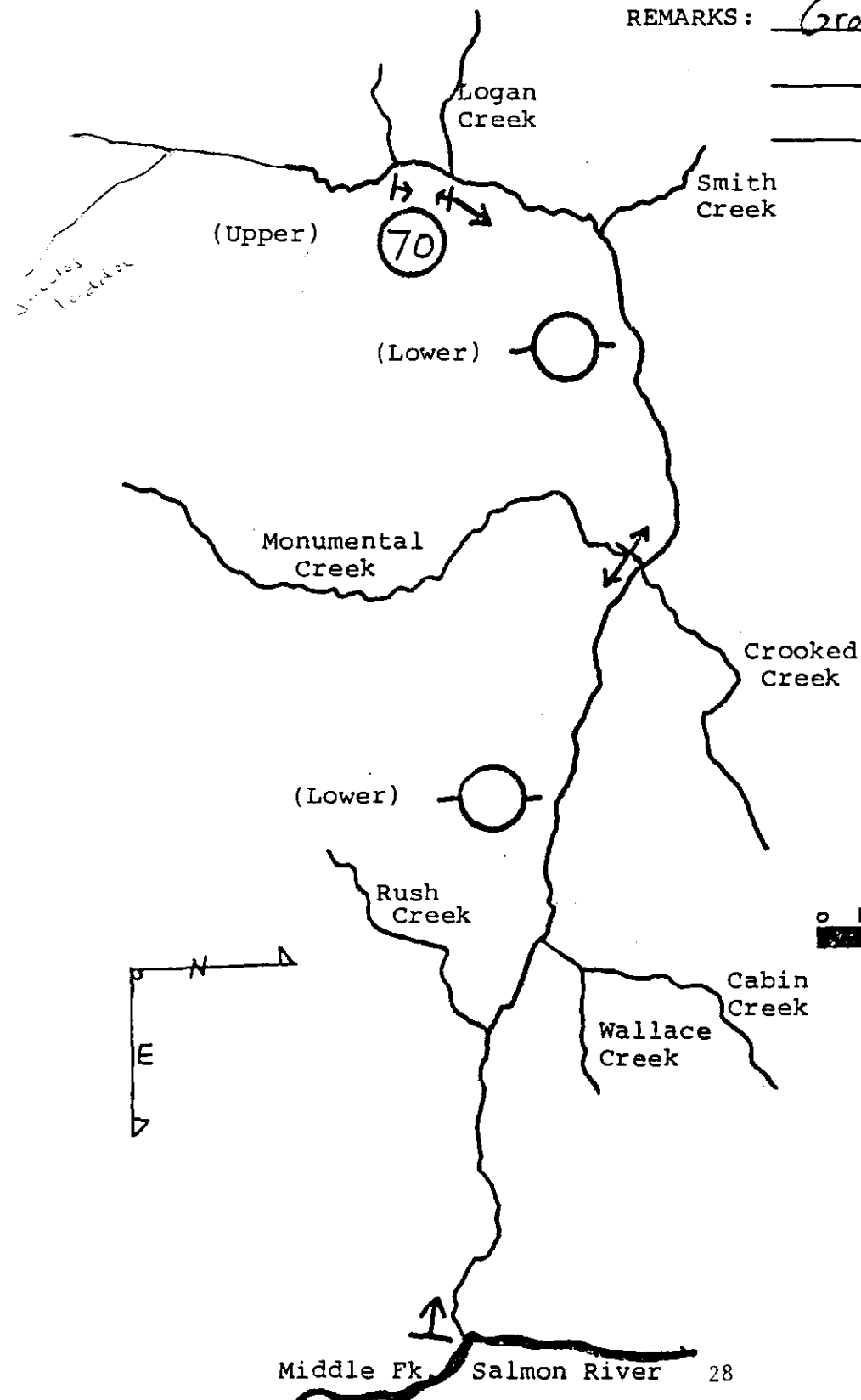
MAP SCALE 1" = 4 miles

OBSERVATION CONDITIONS good

OBSERVER Anderson

TIMING: Early On Time Late (mark one)

REMARKS: Ground Survey



DRAINAGE M. F. Salmon River

SURVEY DATE 8/23/85

STREAM Big Creek (Lower)

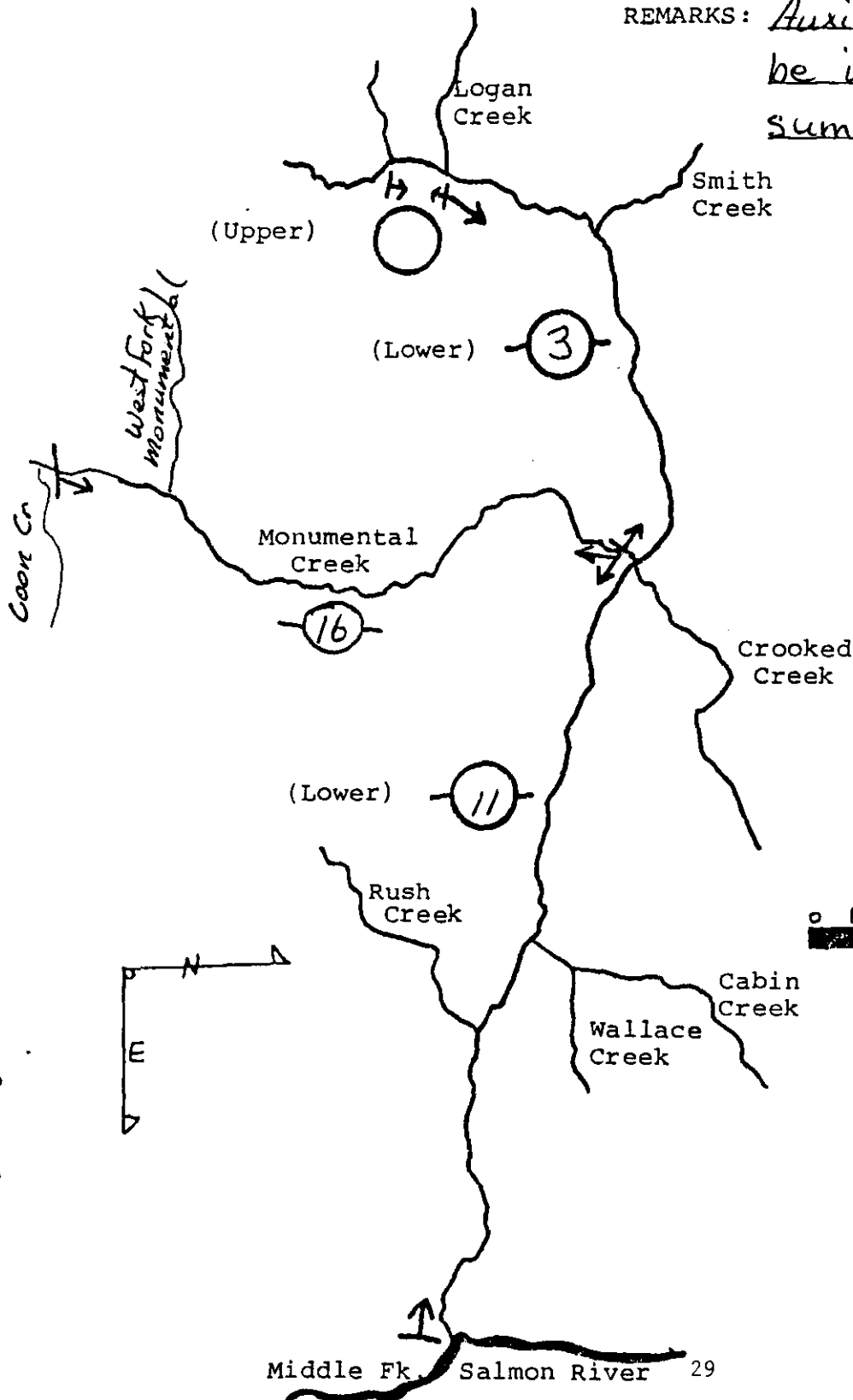
MAP SCALE 1" = 4 miles

OBSERVATION CONDITIONS good

OBSERVER Anderson

TIMING: Early ☐ On Time ☐ Late (mark one)

REMARKS: Auxillary counts, not to be included official summary.



DRAINAGE Salmon River

SURVEY DATE September 5, 1985

STREAM Salmon River

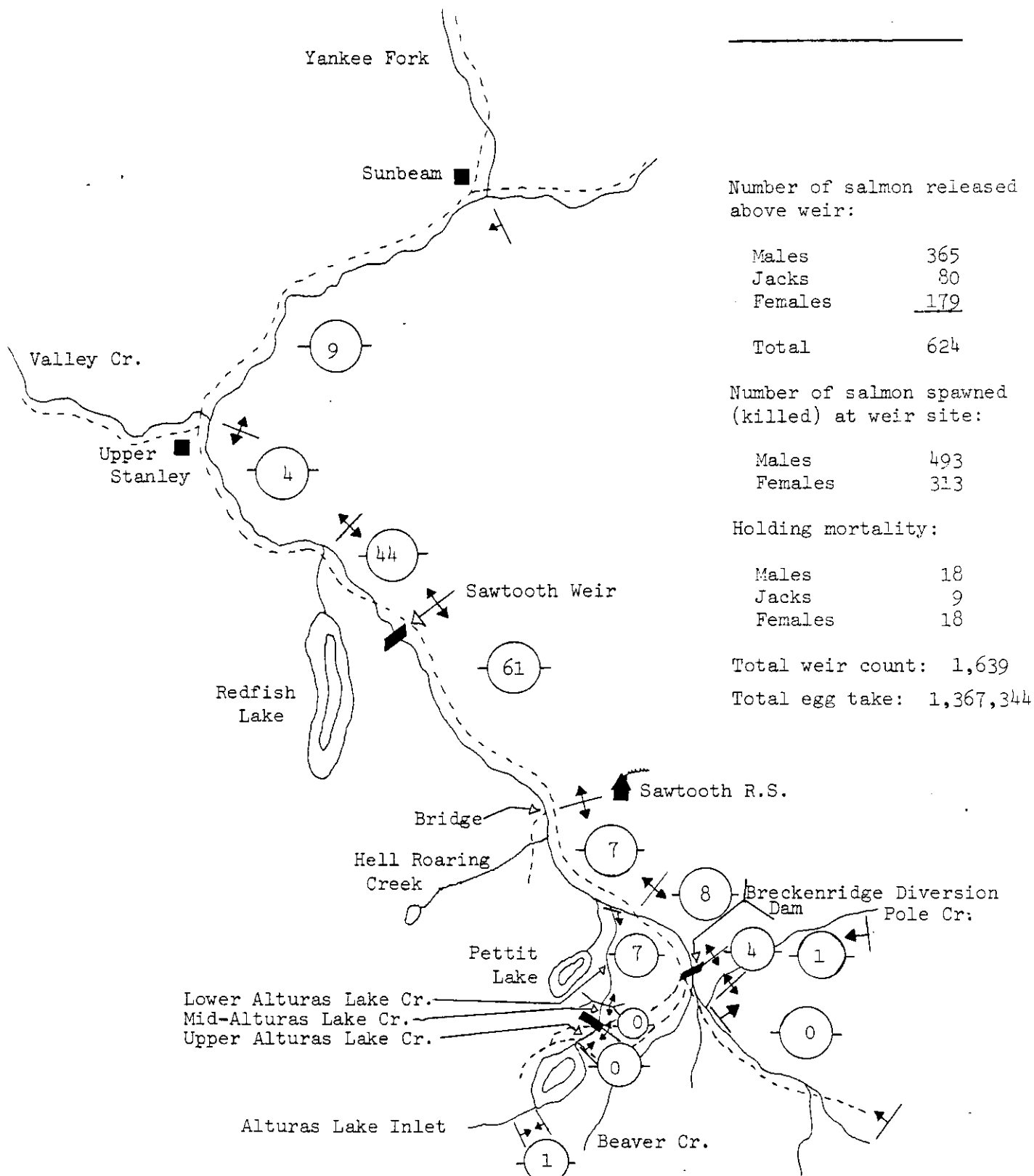
MAP SCALE 1/4" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Helicopter



DRAINAGE Salmon River

SURVEY DATE September 5, 1985

STREAM Valley Creek

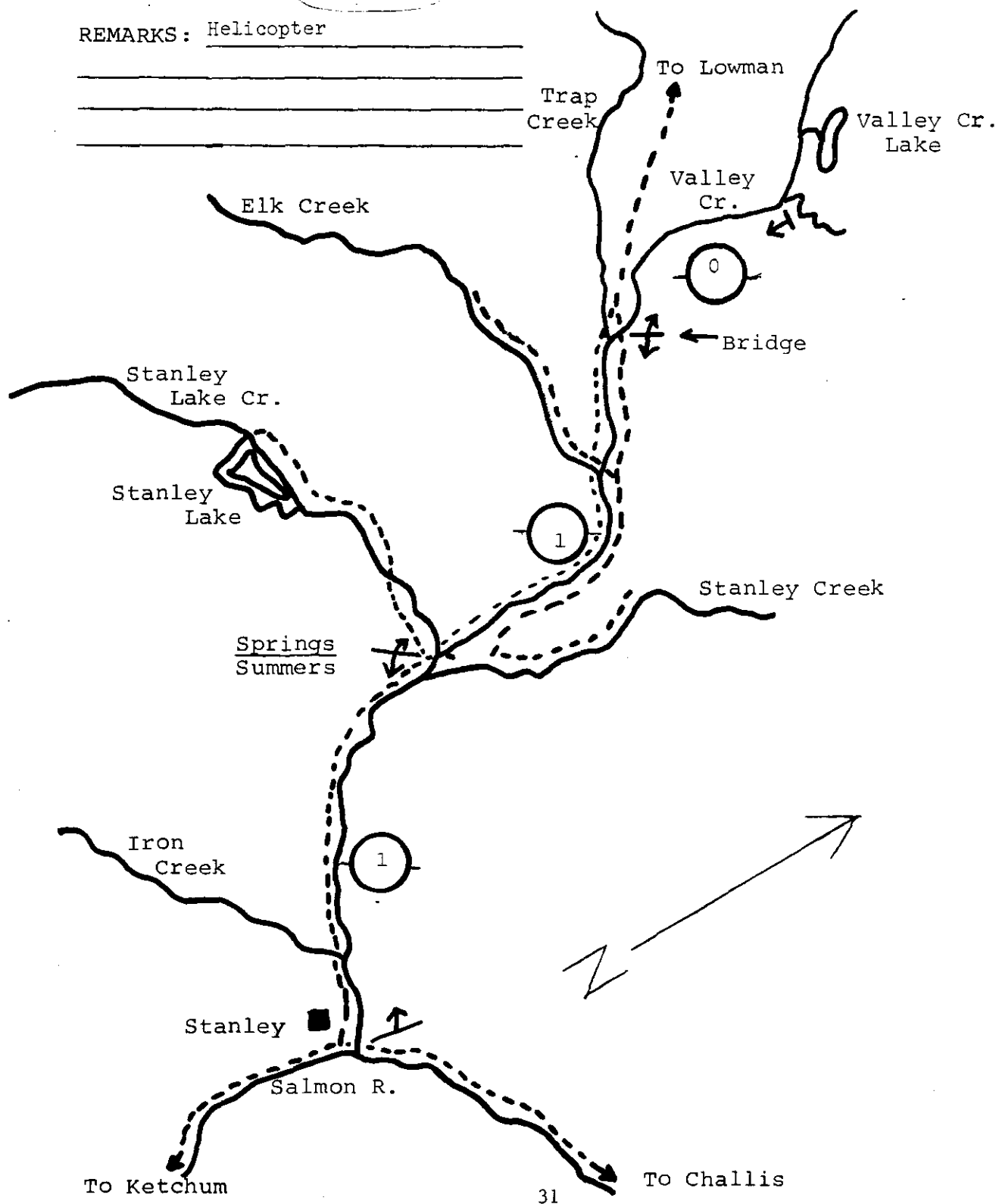
MAP SCALE 2/3" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Helicopter



DRAINAGE Salmon River

SURVEY DATE September 5, 1985

STREAM Salmon River

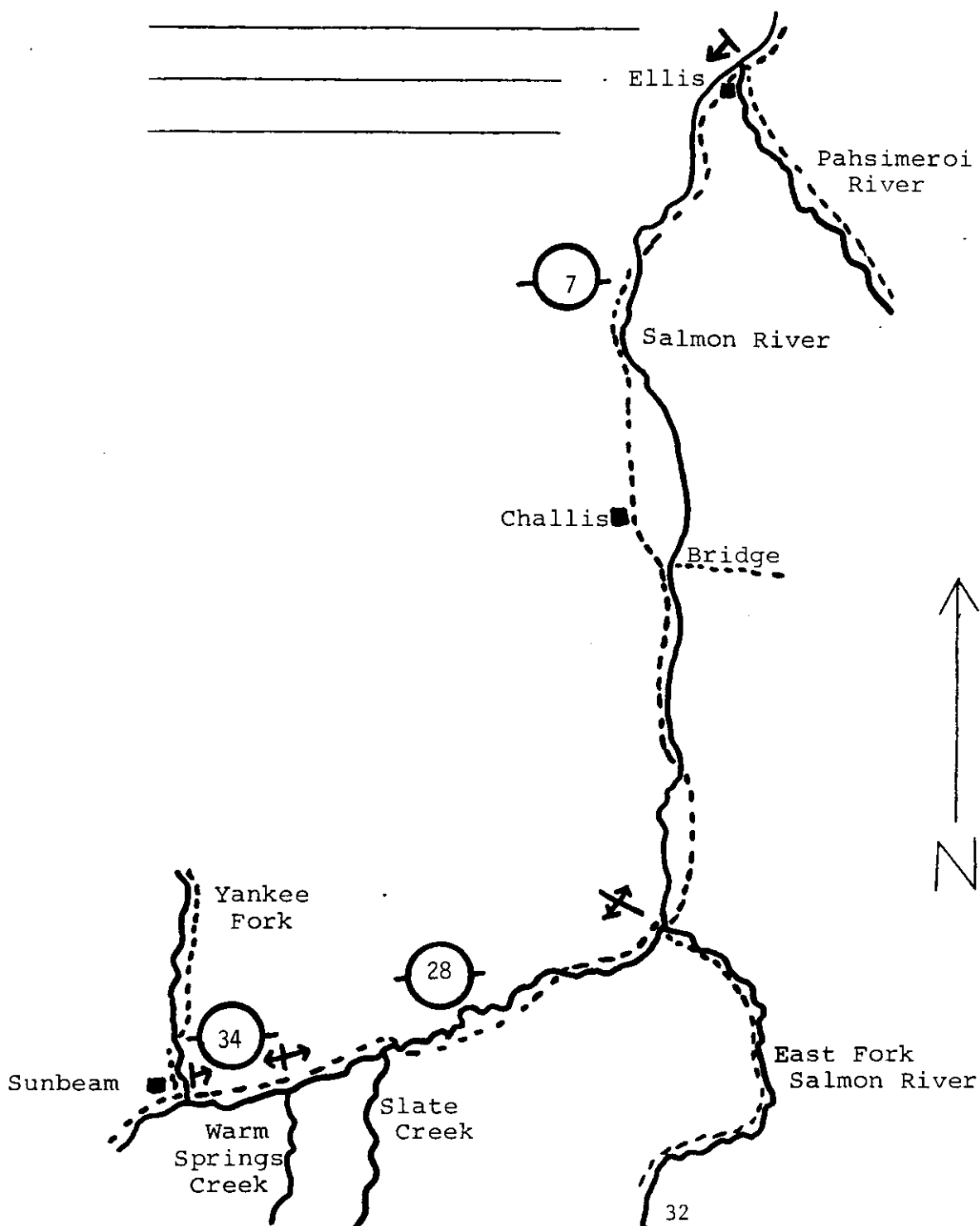
MAP SCALE 1/6" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Helicopter



DRAINAGE Salmon River

SURVEY DATE September 5, 1985

STREAM Yankee Fork

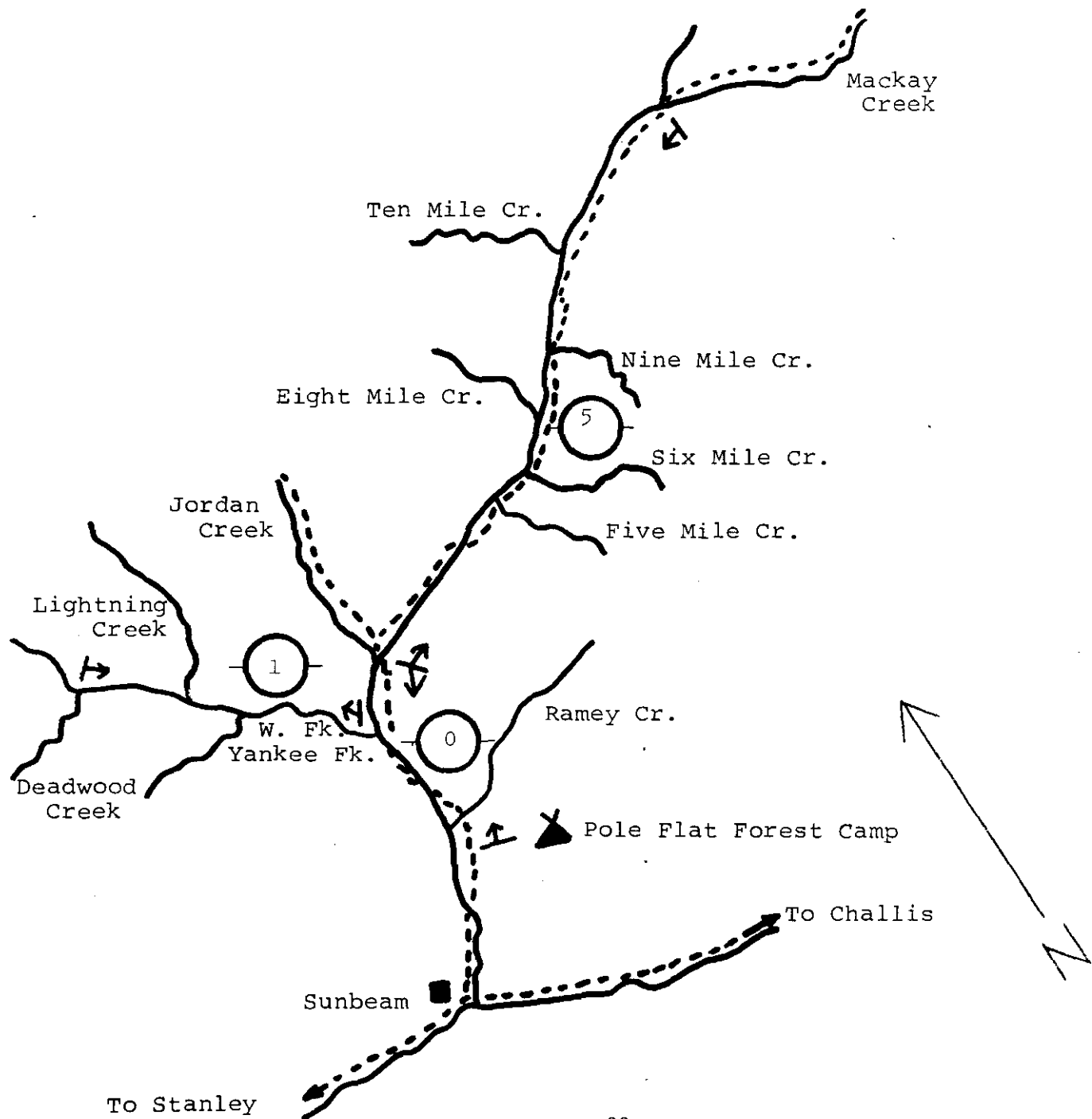
MAP SCALE 1/3" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Helicopter



DRAINAGE Salmon River

SURVEY DATE September 5, 1985

STREAM East Fork

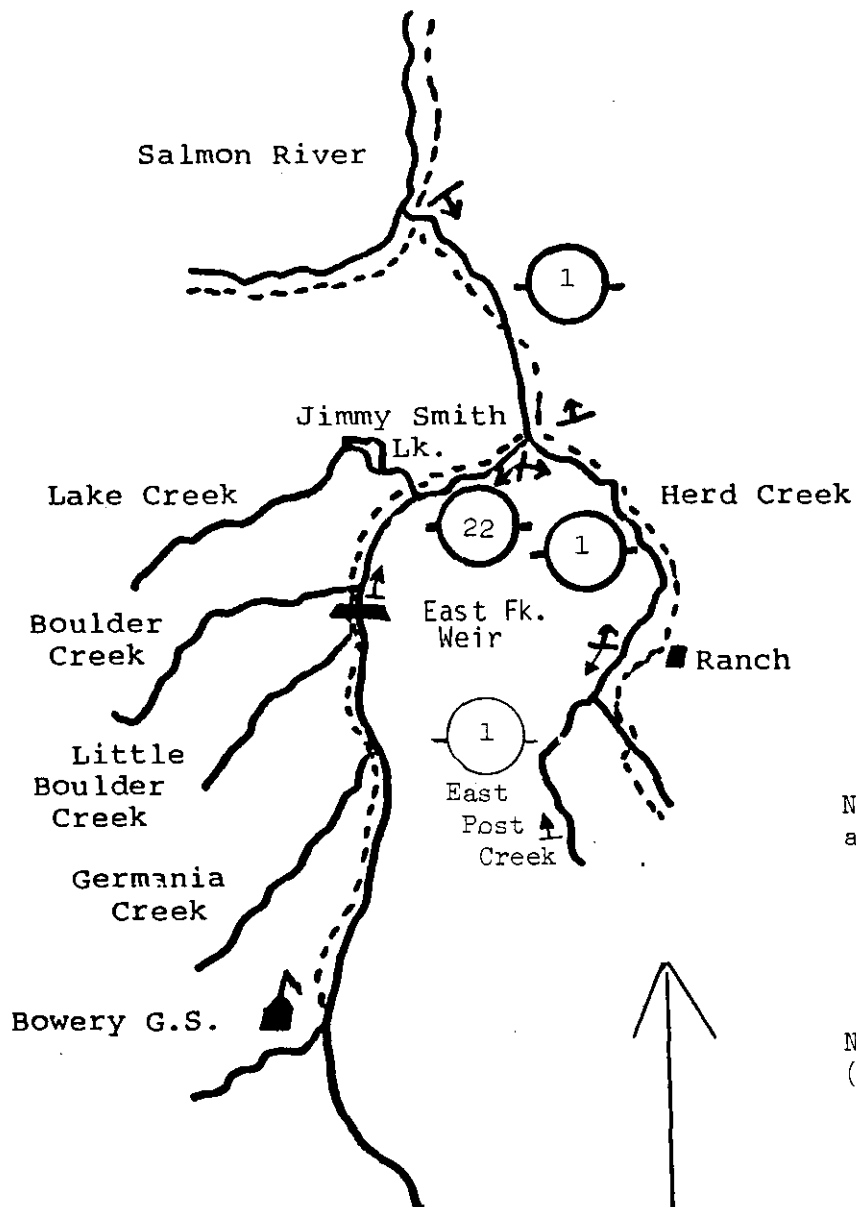
MAP SCALE 1/6" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Helicopter



Number of salmon released
above weir:

Males	93
Jacks	31
Females	18
Total	142

Number of salmon spawned
(killed) at weir site:

Males	76
Females	44

Holding mortality:

Males	1
Females	0

Total weir count: 303
Total egg take: 244,498

DRAINAGE Salmon River

SURVEY DATE September 6, 1985

STREAM Lemhi River

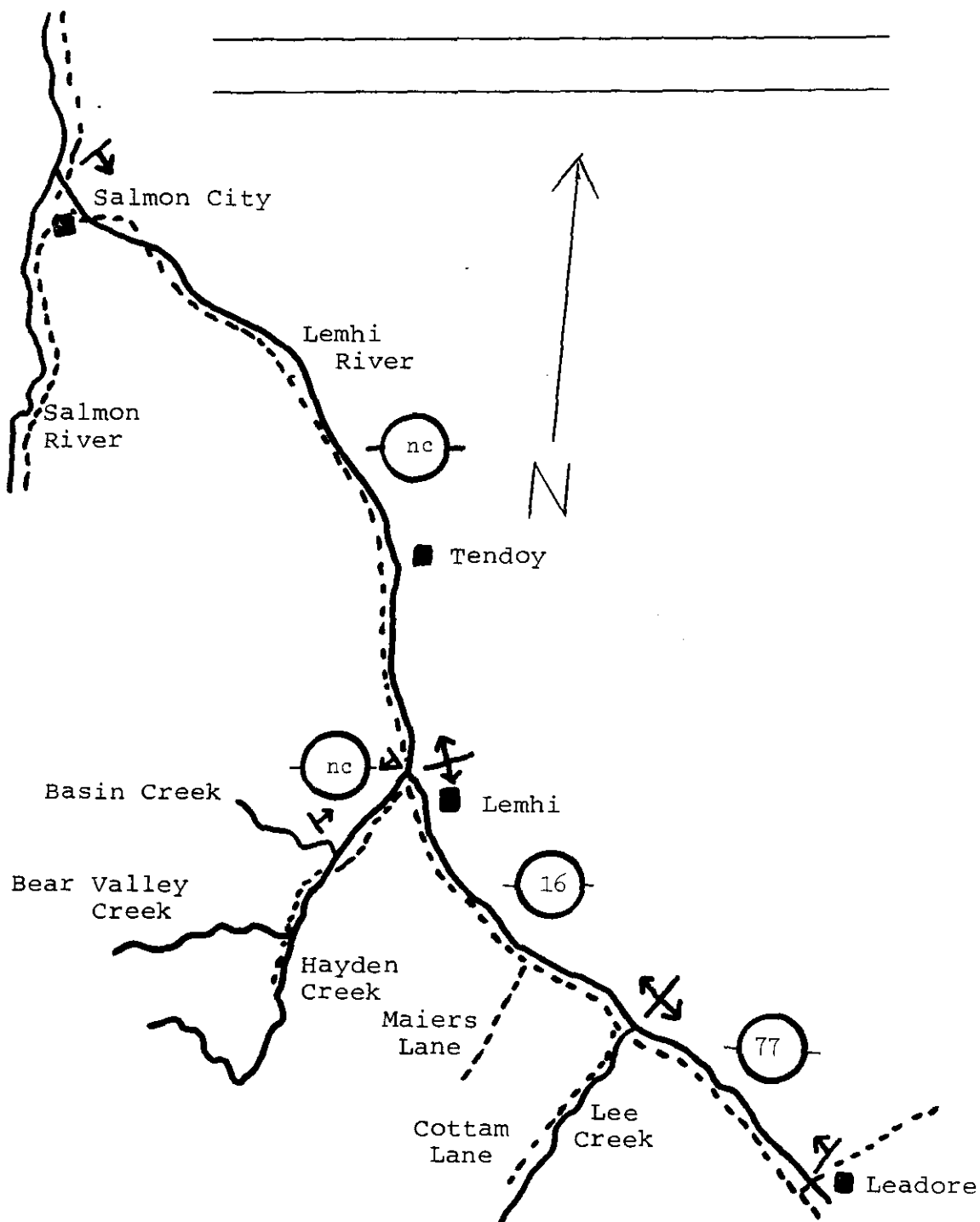
MAP SCALE 1/6" = 1 mile

OBSERVATION CONDITIONS sunny and clear

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Helicopter



DRAINAGE Salmon River

SURVEY DATE _____

STREAM North Fork

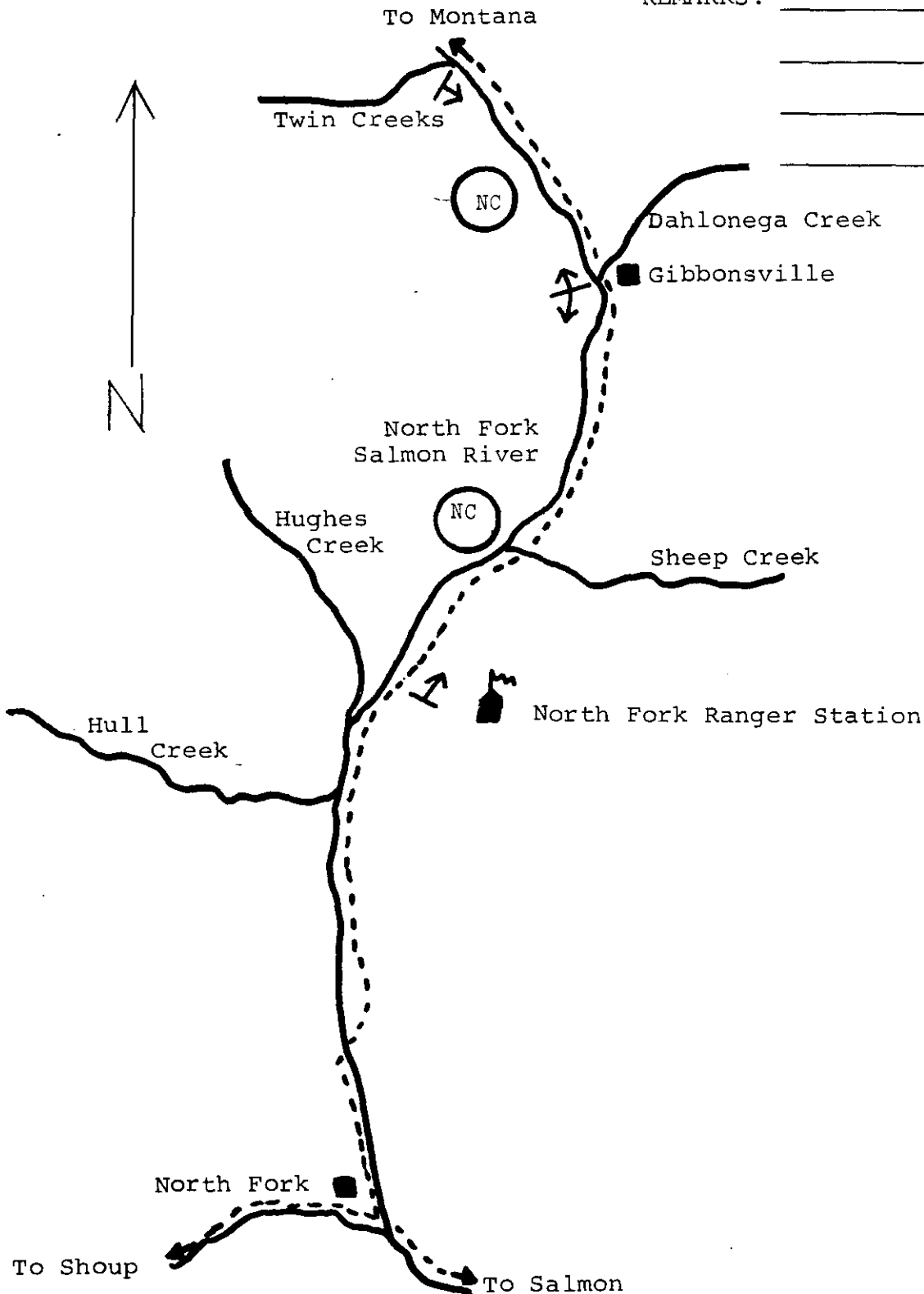
MAP SCALE 1/2" = 1 mile

OBSERVATION CONDITIONS _____

OBSERVER M. Reingold

TIMING: Early On Time Late (mark one)

REMARKS: Not Counted



A P P E N D I X B

DRAINAGE Crooked River & Newsome Creek

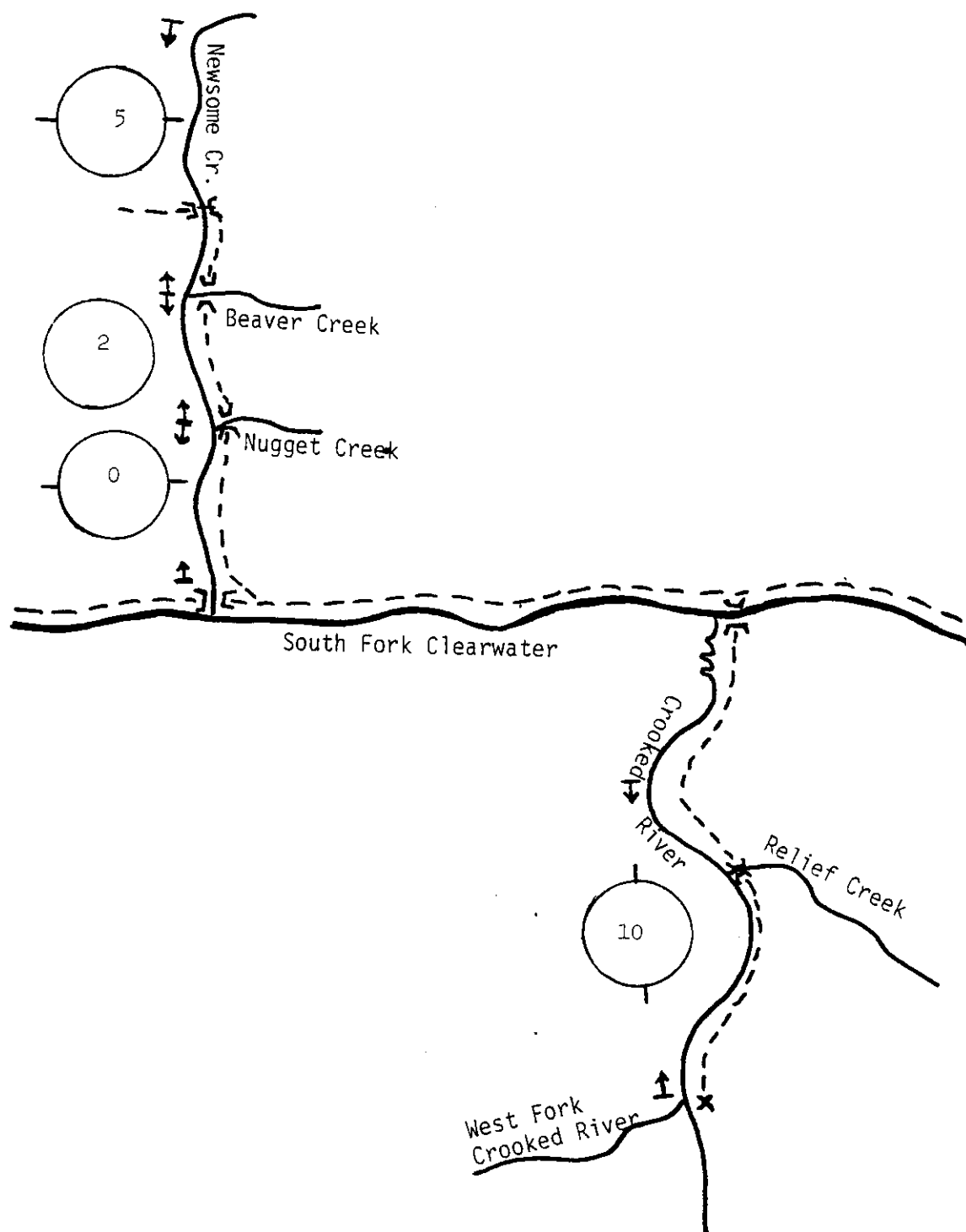
SURVEY DATE 9/4/85

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING: Early On Time Late (mark one)

REMARKS: _____



DRAINAGE Red River & American River

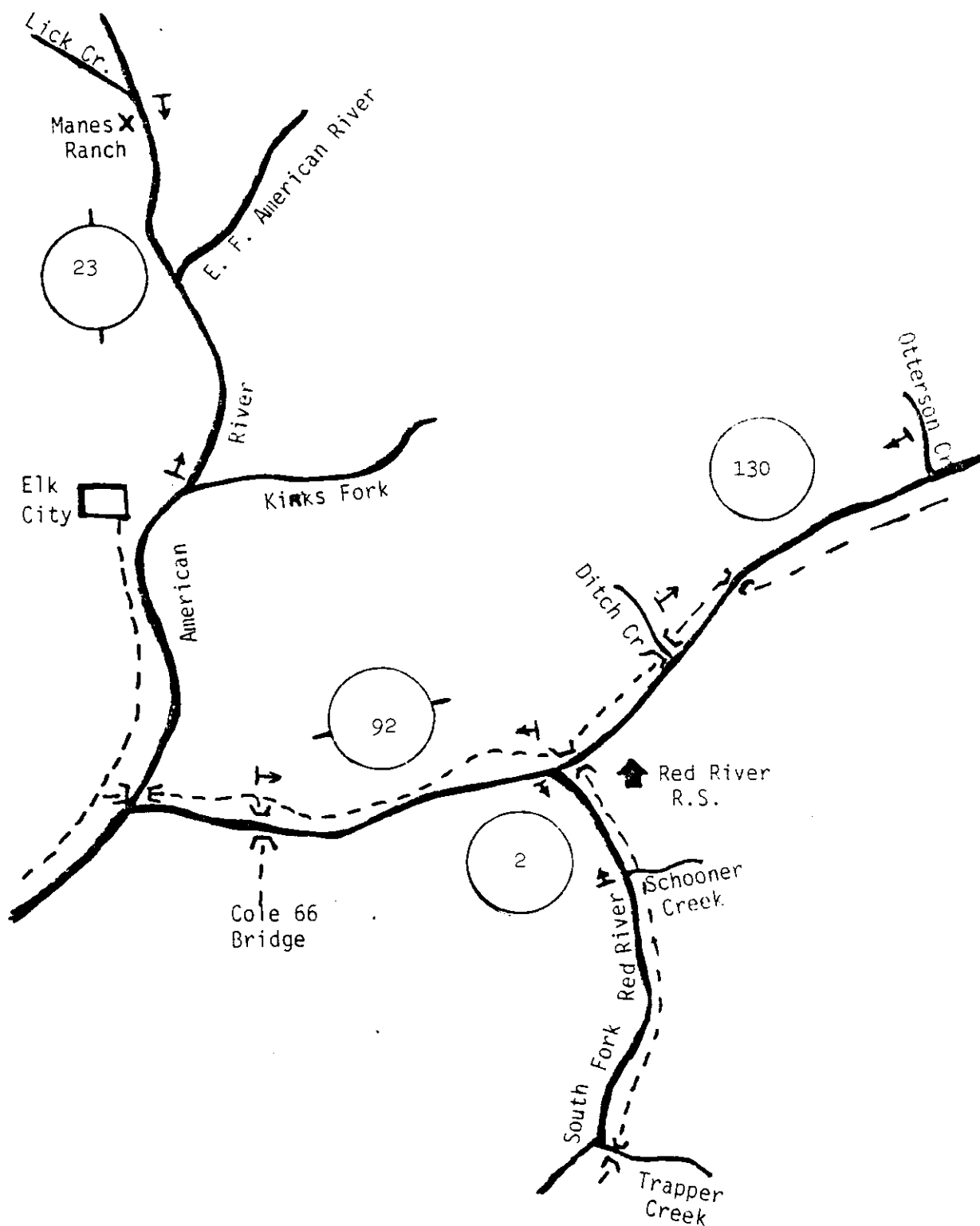
SURVEY DATE 9/4/85

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING: Early On Time Late (mark one)

REMARKS: _____



DRAINAGE Clearwater River

SURVEY DATE 9/3/85

STREAM Selway River & tributaries

MAP SCALE _____

OBSERVATION CONDITIONS Good

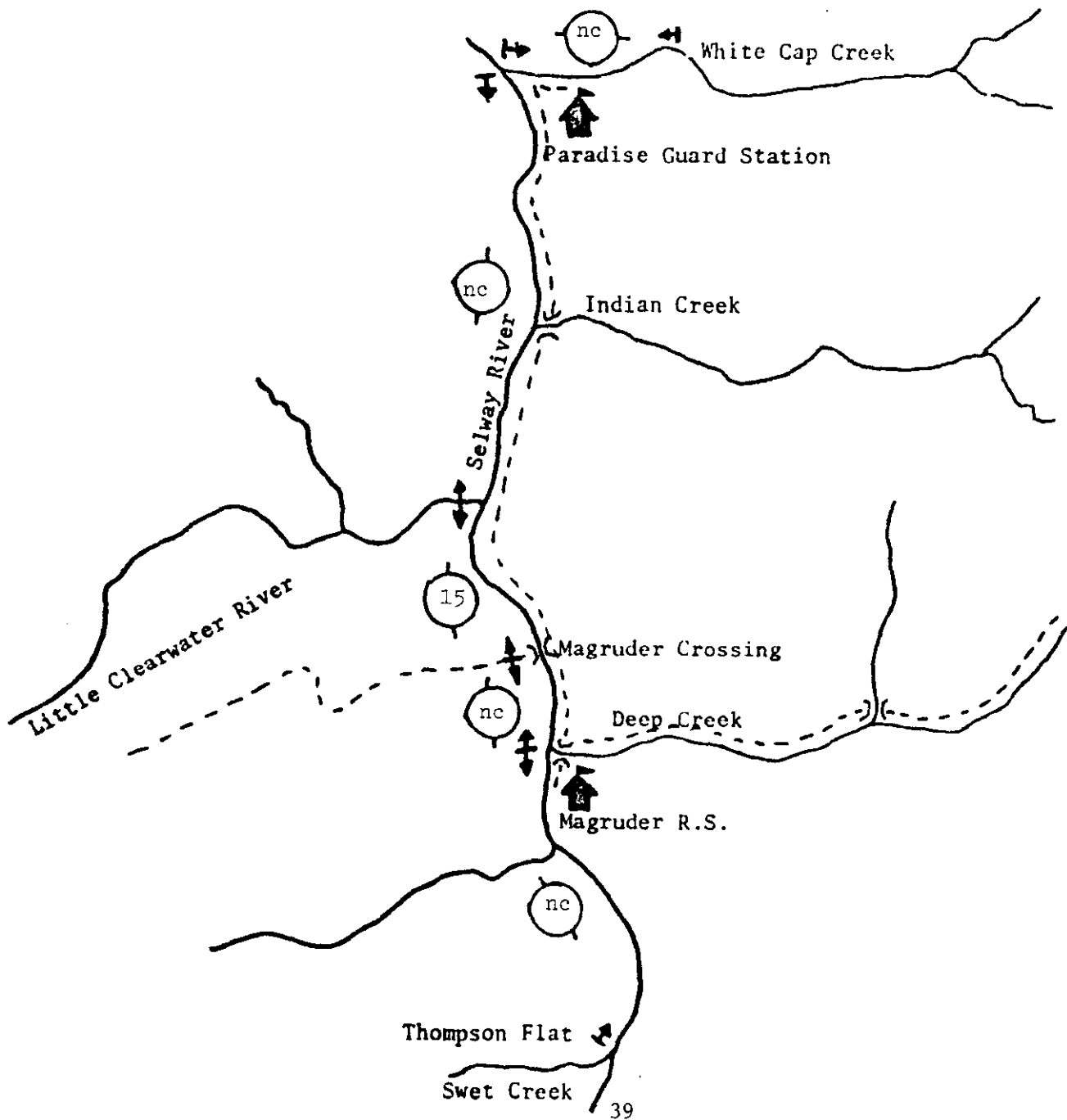
OBSERVER Lindland

TIMING: Early On Time Late (mark one)

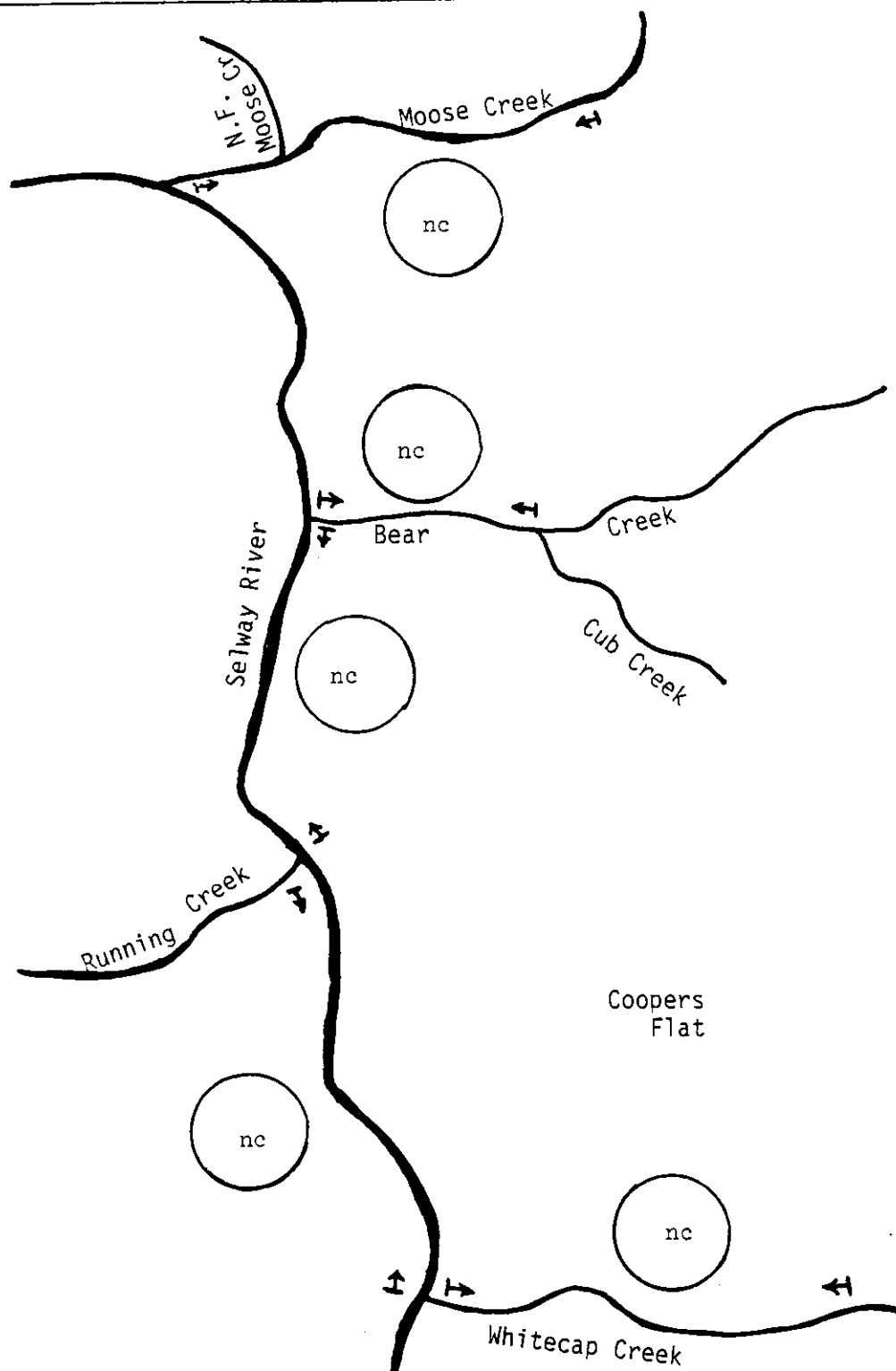
REMARKS: Walking survey only.

Rain, clouds and poor flying conditions in general

for the period 9/5 - 9/19 which prevented flights.



DRAINAGE Clearwater River SURVEY DATE none
OBSERVATION CONDITIONS poor OBSERVER Lindland
TIMING: Early On Time Late (mark one)
REMARKS: Two weeks of rain and poor conditions prevented flying survey.



DRAINAGE Crooked Fork & Brushy Fork

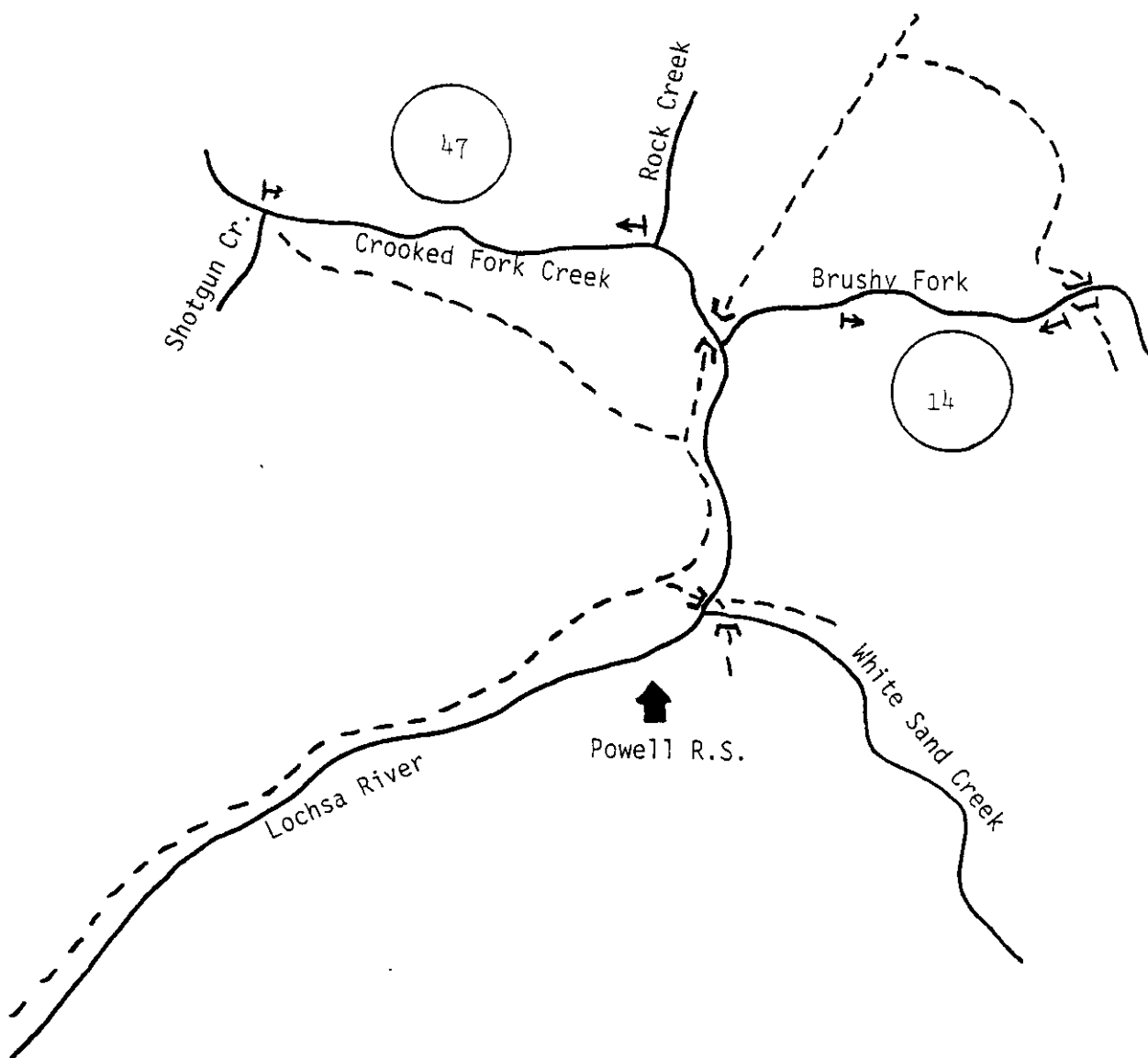
SURVEY DATE 8/27/85

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING: Early On Time Late (mark one)

REMARKS: _____



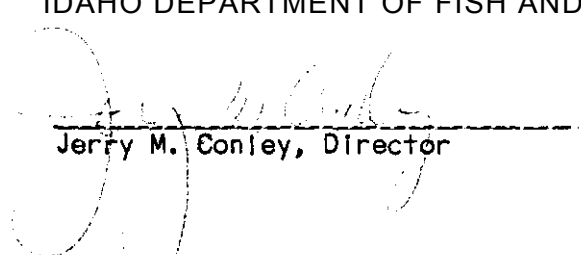
Submitted by:

Judy Hall-Griswold
Fish and Wildlife Technician

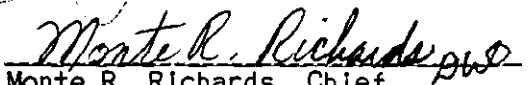
Tim Cochnauer
Principal Fishery Research Biologist

Approved by:


IDAHO DEPARTMENT OF FISH AND GAME



Jerry M. Conley, Director



Monte R. Richards, Chief
Bureau of Fisheries



David W. Ortmann
Fishery Research Supervisor